

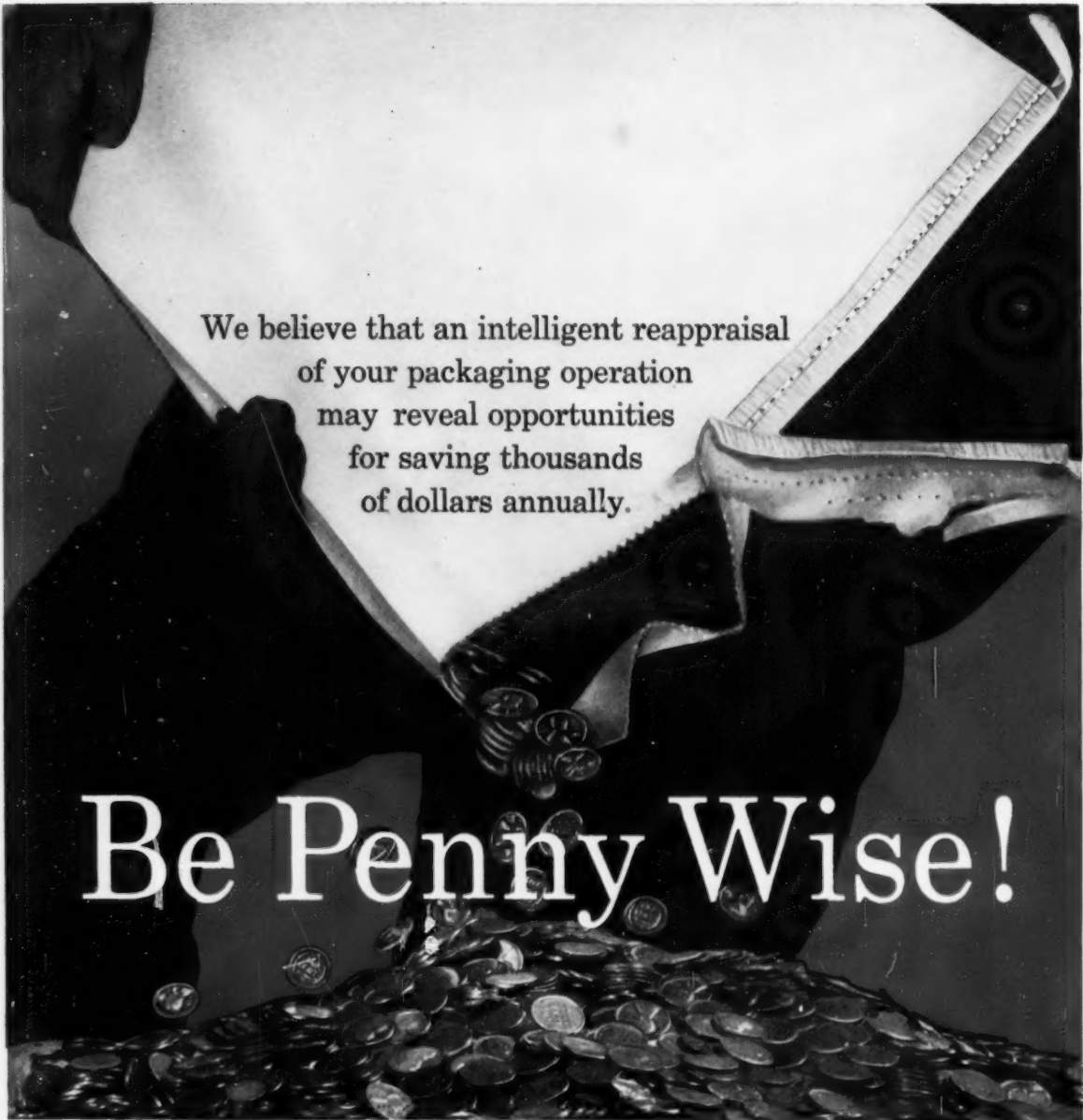
AUGUST, 1958

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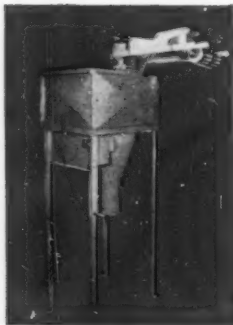
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**C**ommenting  
**F**reely

by BRUCE MORAN

It may sound silly for me to say that the time has come to stop worrying about recession and start serious thought about two major problems that face us. One is the inflation which is sure to come unless we can think of a way to stop it. The other is the shortage of manpower which is just ahead.

The serious-minded and thorough Committee for Economic Development is warning about inflation and the need to take steps. A great many economists and others have for some time now been pointing out that there was a period of few

births, which today is producing a shortage of young and vigorous workers. That won't last long. The early 1960's will correct it. But good personnel relations are vital now. And mechanization is equally important—to cut manpower, to let older workers handle the heavy lifting.

Both of these affect our industry. One affects the value of our cash reserves. The other endangers our ability to produce the goods for which demand is slowly but surely rising.

Things to think about, and to plan for.

Vol. 97 No. 2

Established 1910

August, 1958

# **C**ommercial **F**ertilizer

and PLANT FOOD INDUSTRY

Subscription rates: United States, \$3.00 per year; 5 years, \$12.00.  
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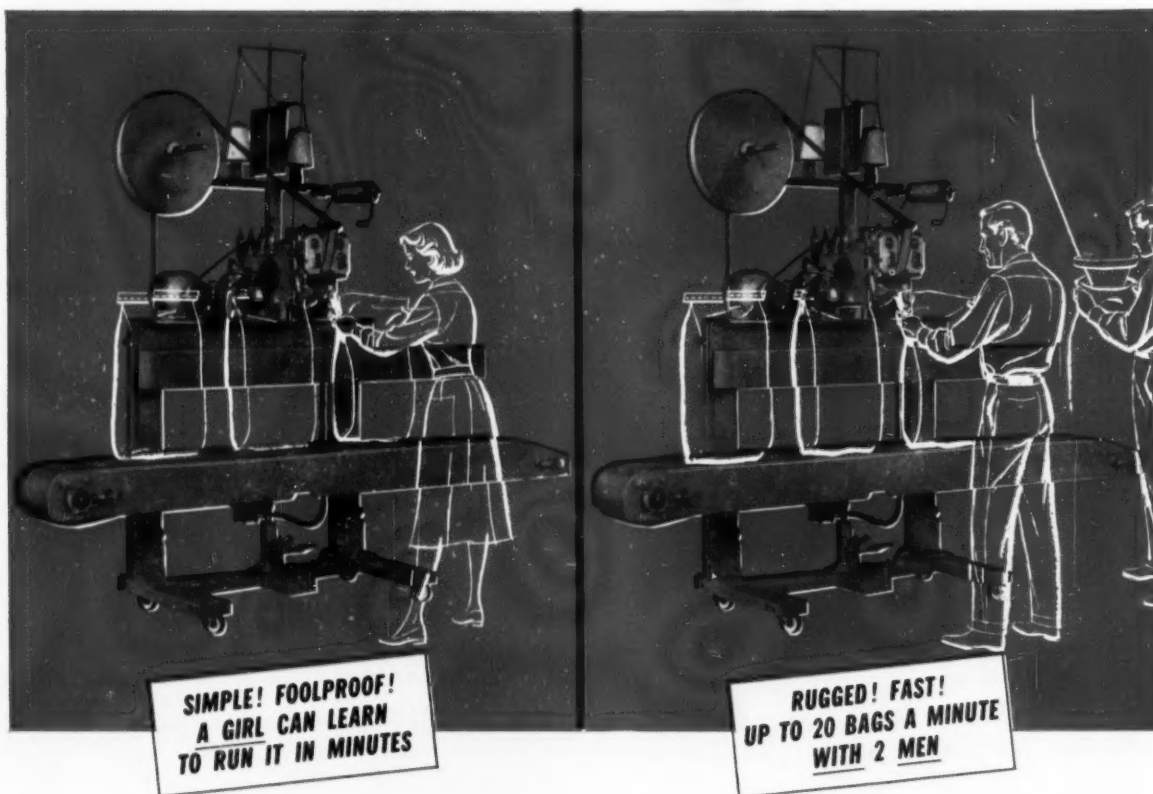
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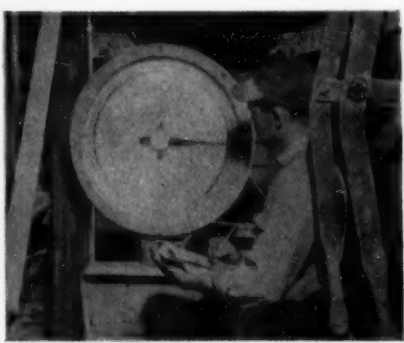
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SO remember, overall income is off only 2% from the peak. Industry is beginning to realize that demand will arise soon. And the farmer is a pretty happy man in general, having been the one to lead us out of the wilderness.

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Yours faithfully,

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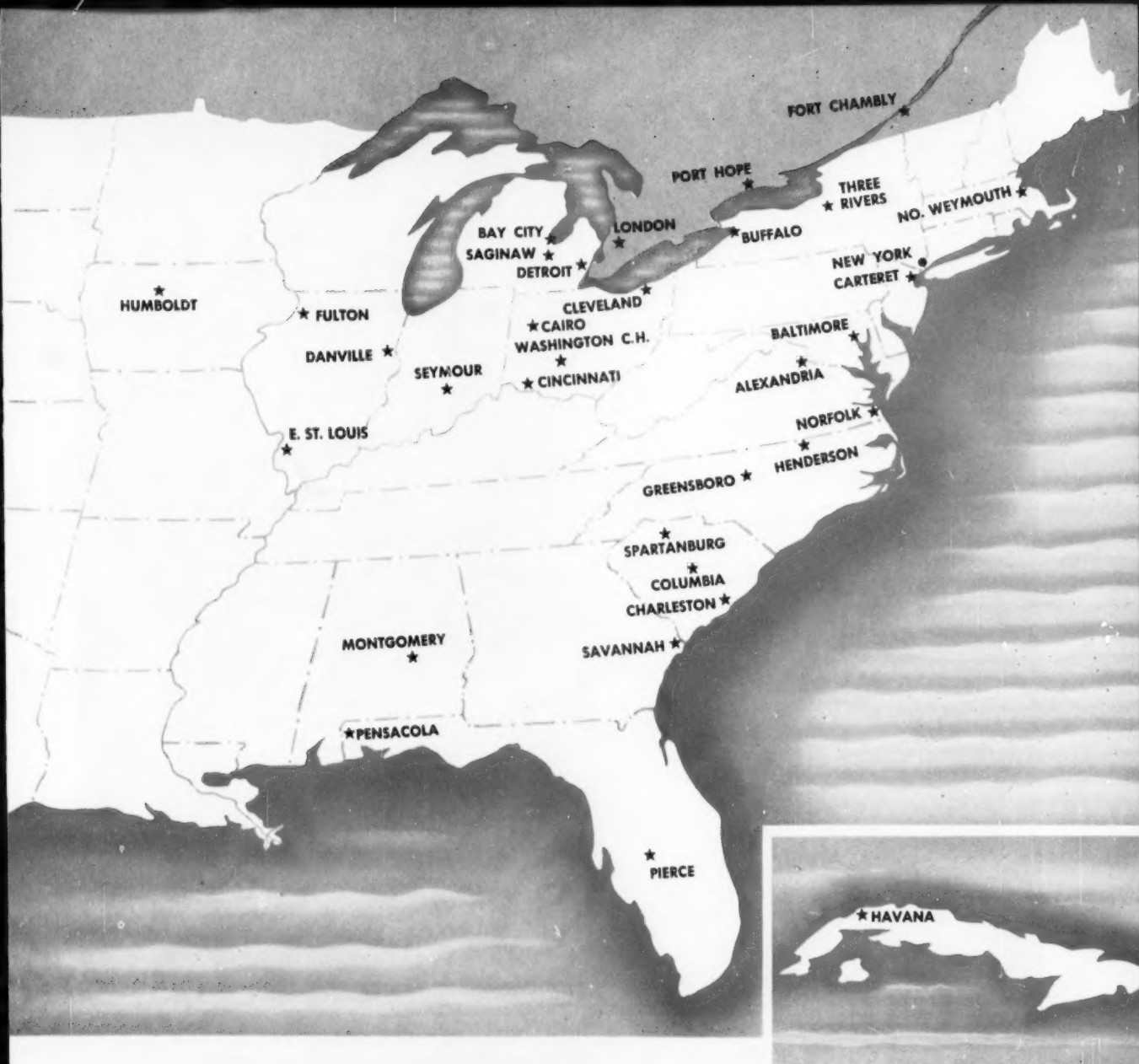
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# Economic Considerations relating to Product Standardization in Fertilizer Marketing

by EARL R. SWANSON

The quality of a fertilizer is a combination of plant food content and other attributes, including those pertaining to form (dry v. liquid, bagged v. bulk, chemically manufactured v. physically mixed, granulated v. pulverized, etc.). Such accompanying services as soil testing, dealer recommendations, and credit are also attributes of fertilizer quality at the retail level.

Each quality attribute has two dimensions: (1) its level in terms of specifications determined by the producing firm and (2) the degree of conformance of individual fertilizer lots to these specifications or to a guaranteed quality level. Consequently, standardization has two aspects. A market characterized by a narrow range of quality variation or "design" among products offered has a high degree of "standardization." In the second sense, a fertilizer that has low lot-to-lot variation with respect to its desired predetermined quality level is "standardized."

## Standardization versus Quality Variety

Conditions favorable for development of standardization of the first type (or its opposite-product differentiation) may be analyzed by reference to a simple model describing the behavior of a fertilizer producer.

Suppose that the relevant demand function for the fertilizer producer is: (Equation 1)  $q = q(p, x)$  where  $q$  is the quantity of fertilizer sold per unit of time,  $p$  is the price per unit, and  $x$  is an index of the particular quality attribute under consideration. Brems (4) has suggested a method for quantification of various quality attributes by considering a change in quality as a variation in the relevant input-output coefficient.

A cost function denoting the effect of quantity,  $q$ , and the quality index,  $x$ , on cost may be written as follows: (Equation 2)  $c = c(q, x)$  where  $c$  is the average cost per unit of  $q$ .

It can be shown (8, 19) that the

Earl Swanson, who is remembered by many of our readers for his October, 1955 article on minimizing the cost of fertilizer mixes through linear programming, is associate professor in the department of Agricultural Economics at the University of Illinois, Urbana.

His work for this study of product standardization was performed under a grant from Tennessee Valley Authority, and a progress report was made at TVA's seminar for cooperators in the economics program this spring, although the final manuscript wasn't completed until last month.

Earl is now 'vacationing' from Urbana on a foreign assignment for the next year.



EARL SWANSON

condition for profit maximization (joint optimization of quality and price) is: (Equation 3.)

$$-\frac{\partial q}{\partial p} = \frac{\frac{\partial q}{\partial x}}{\frac{\partial c}{\partial x}}$$

The left member is the slope of the demand curve. The right member indicates the rate of increase of quantity sold with improved quality in relation to increases in average cost necessary to increase quality. The conditions giving rise to an improvement of product quality are those that have the net effect of making the right member greater than the left. Changes in market structure tending toward quality improvement are indicated in Figure 1 (A and B). The effect of technical conditions affecting quality within the firm is indicated in Figure 1C.

Assume that equilibrium has been established at points  $k$  with the prevailing relationships indicated by the solid lines. A change in slope to the dotted line in Figure 1A indicates a decrease in price sensitivity and would tend toward quality improvement. Similarly, a change in quality sensitivity ( $\partial q/\partial x$ ) to that

indicated by the dotted line in Figure 1B would, by itself, cause equilibrium to occur at a higher level of quality. Finally, a change in the technical relation in Figure 1C to decrease the marginal cost of improved quality would tend, other things being equal, toward quality improvement. The trend toward higher analysis fertilizers is an example of a quality improvement in which the lowering of the marginal cost of increased quality was an important factor. This was made possible by the technological improvements in fertilizer manufacturing.

The apparatus of Figure 1 (A and B) permits a classification of the market conditions leading to product standardization and to its opposite—quality variety. The usual price-quantity demand relationship in Figure 1A is, in the case of a producer's good like fertilizer, determined from the marginal value productivity of fertilizer. If the buyers who collectively make up the price-quantity demand relation may be separated into groups each having a distinct marginal value productivity, then even if all buyers were uniformly sensitive to quality variation the fertilizer producer could increase profits by treating each group separately and offering different qualities at different prices to each group. One would expect the various crops and soils to have different responses and hence different marginal value productivities for fertilizer with a given set of quality attributes. Quality variation from this source depends, of course, on fertilizer price being an important variable in the fertilizer buyers' demand function.

Farm income, rather than fertilizer price, has frequently been used to explain fertilizer sales (13). The derived demand (marginal value productivity) for fertilizer is dependent on crop prices as well as on the physical response. Thus, even though income (current and/or lagged) may appear to explain a large part of fertilizer sales, the marginal value productivity of fertilizer anticipated by farmers may



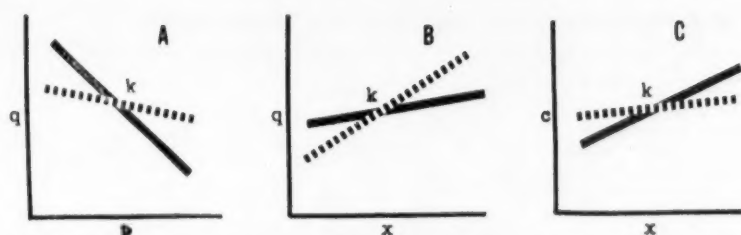


Figure 1. Relationships Determining Optimal Price-Quantity-Quality Combination

be based on favorable crop-fertilizer price ratios experienced in years of high income. Berry (2) indicates that income elasticity, which was relatively high prior to 1948, has probably decreased since then. On the basis of the results of a survey of farmers and dealers in Indiana, Berry (2) also suggests that dealers considered the demand for fertilizer to be both more price elastic and income elastic than did farmers.

If all buyers had the same price-quantity demand function but differed in quality responsiveness (Figure 1B), providing different qualities at different prices to the separate groups would increase profits over complete standardization. The greatest variety of quality would be offered in a market in which the groups sensitive to price variation were insensitive to quality variation and vice versa. For example, if the quality attribute is the fertilizer particle size (granulated v. pulverized), one group of farmers may shop with the principal criterion of

cost per pound of plant food and pay little attention to the particle size. Another group may be primarily interested in the convenient handling and the drillability associated with granulated materials and be insensitive to price variation, at least in the price range that is present in the market.

It is suggested that the existence of bulk-blenders who also sell chemically manufactured fertilizers indicates that the buyers are being separated into two markets. The price-sensitive buyers are insensitive to the purported quality effect of homogeneity of analysis within lot. The reverse holds true for buyers of chemically manufactured goods.

Similar to the price-quantity demand curve in Figure 1A, the quality-quantity relationship in Figure 1B is dependent upon the response of the crop to quality changes (quantity and fertilizer price constant) and the crop price. The effects of quality attributes on yield have, in

general, received considerable attention from agronomists. Since we consider plant food content as a quality attribute, all rate experiments are intended to improve estimates of the relationship in Figure 1A and B. Adding to these, experiments that are designed to estimate the crop yield response to other quality variables would make a list of practically all fertilizer experiments intended to serve as a basis for recommendations to farmers.

#### Advertising Outlays

Although both demand relationships (1A and B) have, in common with other producers' goods, a technical basis, the uncertainty concerning the relationships on any given field in any given year makes these relationships assume the aspects of a consumer's good. This uncertainty is one reason that the market relationships in Figure 1A and B are susceptible to manipulation by advertising outlay. The uncertainty regarding the crop response to either quality or quantity changes in fertilizer cannot be elaborated here. However, some of the numerous indications of its magnitude may be mentioned.

For example, the rather large shrinkage in correlation between soil tests and crop response (12) as we move from greenhouse to field is indicative of the difficulty of predicting response. If the estimated initial nutrient levels are of a very approximative nature, the derived demand in terms of a marginal value

Table 1. Tolerance Levels for Principal Plant Nutrients Under Florida Commercial Fertilizer Law.

(Penalties Are Three Times the Value of the Deficiency in Excess of Tolerance Level.)

Total nitrogen		Available phosphoric acid		Soluble potash	
Analysis guaranteed (percent)	Tolerance level (deficiency in percent)	Analysis guaranteed (percent)	Tolerance level (deficiency in percent)	Analysis guaranteed (percent)	Tolerance level (deficiency in percent)
4 and under	0.20	10 and under	0.40	2 and under	0.20
5-6	0.30	10-25	0.50	3	0.30
7-8	0.40	over 25	0.75	4	0.40
9-11	0.50			5-8	0.50
12-30	0.60			9-20	0.60
over 30	0.75			over 20	1.00

Table 2. Tolerance Levels for Principal Plant Nutrients Under South Carolina Law.

(Penalties Are Three Times the Value of the Deficiency in Excess of Tolerance Level for Nitrogen and Four Times the Value of the Deficiency for Phosphoric Acid and Potash.)

Total nitrogen		Available phosphoric acid		Soluble potash	
Analysis guaranteed (percent)	Tolerance level (deficiency in percent)	Analysis guaranteed (percent)	Tolerance level (deficiency in percent)	Analysis guaranteed (percent)	Tolerance level (deficiency in percent)
3	0.30	10	0.40	3	0.30
4	0.35	11-25	0.50	4	0.40
5-8	0.40	over 25	0.75	5-8	0.50
9-30	0.50			9-20	0.60
over 30	0.75			over 20	0.75

Table 3. Analyses of Selected Registered Commercial Fertilizers, Illinois, 1955<sup>1</sup>

	Straight materials					Mixed goods						
	Ammon- ium nitrate	Ammon- ium sulphate	Normal super phos- phate	Triple super phos- phate	Muriate of potash	4-16-16	3-12-12	10-10-10	5-20-20	12-12-12	0-20-20	3-9-27
Number of samples	20	13	22	19	44	58	52	49	37	31	39	40
Guaranteed analysis (%)												
N	33.50	21.00	--	--	--	4.00	3.00	10.00	5.00	12.00	--	3.00
P <sub>2</sub> O <sub>5</sub>	--	--	20.00	45.00	--	16.00	12.00	10.00	20.00	12.00	20.00	9.00
K <sub>2</sub> O	--	--	--	--	60.00	16.00	12.00	10.00	20.00	12.00	20.00	27.00
Mean analysis of samples (%)												
N	35.284	22.054	--	--	--	4.369	3.344	10.345	5.262	12.056	--	3.236
P <sub>2</sub> O <sub>5</sub>	--	--	21.673	45.907	--	16.617	12.698	11.412	20.271	13.534	20.688	9.942
K <sub>2</sub> O	--	--	--	--	60.966	16.537	13.135	10.824	19.606	13.071	21.182	27.918
Standard deviation of sample mean (%)												
N	0.178	0.149	--	--	--	0.059	0.038	0.130	0.085	0.133	--	0.044
P <sub>2</sub> O <sub>5</sub>	--	--	0.081	0.103	--	0.177	0.137	0.261	0.426	0.238	0.300	0.167
K <sub>2</sub> O	--	--	--	--	0.072	0.206	0.178	0.114	0.640	0.228	0.352	0.283
Standard deviation of sample mean as a percent of mean												
N	0.504	0.676	--	--	--	1.350	1.136	1.257	1.235	1.103	--	1.360
P <sub>2</sub> O <sub>5</sub>	--	--	0.374	0.224	--	1.065	1.079	2.287	2.102	1.759	1.450	1.680
K <sub>2</sub> O	--	--	--	--	0.118	1.246	1.355	1.053	3.264	1.744	1.662	1.014

<sup>1</sup> Report of the Analysis of Commercial Feeds and Commercial Fertilizers, 1956. Department of Agriculture, Springfield, Illinois.

productivity will be hazy in prospect, irrespective of accurate determinations of response functions. Also, nitrogen soil tests do not yet appear to have effective yield-predicting properties (5). The soil-sampling problem has been cited by Smith (20) as the weakest link in the soil-testing programs. He concludes that there is little benefit in refining laboratory procedures further unless sampling errors are reduced. The relation of lack of soil uniformity within fields to the soil-sampling problem has received but little attention. One exception is an article by Reed and Rigney (17).

In addition to the uncertainty surrounding the fertilizer-yield relationships in commercial situations, the number of fertilizer manufacturing firms is sufficiently small to be conducive to spending funds on advertising. For example, of the following selected analyses of mixed goods sold in Illinois in 1956, a substantial part was sold by the ten leading firms:

Percent of total sales of each analysis produced by the ten firms leading in aggregate sales of all analyses.

Analysis	%
4-16-16	71.8
3-12-12	89.0
10-10-10	78.7
5-20-20	73.0
12-12-12	61.4
0-20-20	70.3
3-9-27	83.2

The importance of advertising means that the model presented above (equations 1, 2, and 3) needs to be enlarged to include selling effort. If we define advertising as

any expenditure that influences the shape or position of the firm's demand curve and that enters the cost function as a fixed cost, Dorfman and Steiner (8) have presented the relevant theory: A profit-maximizing firm that can influence the demand for its product by advertising will choose the advertising budget and product price which result from equating the marginal value productivity of advertising to the elasticity of demand. Thus, if we denote the relationship between quantity per unit of time,  $q$ , price per unit,  $p$ , and advertising outlay,  $s$ , as follows: (Equation 4)  $q = q(p, s)$  the condition for an optimal price-quantity-advertising budget combination is: (Equation 5)

$$p \frac{\partial q}{\partial s} = \frac{p}{q} \frac{\partial q}{\partial p}$$

The condition of equation (5), together with the condition for a quality-price optimum in equation (3), will provide a joint quality-price-advertising outlay optimum if there is at least some advertising. Since a perfectly competitive market is characterized by an infinite demand elasticity, this condition does not pertain to firms doing no advertising. The effect of an increase in advertising on demand elasticity is, of course, difficult to evaluate; it may serve either to increase or decrease elasticity (3). However, heavy advertising occurs in markets in which product differences are important in the minds of consumers but difficult for them to measure and evaluate.

Uncertainty with respect to the

physical yield responses of fertilizer means that consumers may be influenced to differentiate between fertilizers which are technically perfect substitutes. Brand allegiance may also develop as a result of the coincidence of a good or bad season with a farmer's trial of a particular type of fertilizer. The experience of some Illinois farmers with anhydrous ammonia during a very dry season has caused them to have a distorted picture of its technical substitutability for other nitrogen sources.

### Quality Conformance

Product standardization in this sense refers to maintenance of a low lot-to-lot deviation from the specified level of the quality attribute. Although the fertilizer producer seeks to maintain a certain level of quality control on all attributes, he is required by the relevant state laws to meet certain requirements in regard to primary plant foods and in some states certain trace elements and toxic ingredients. The quality control necessary to comply with state inspection is for the primary purpose of facilitating the flow of fertilizer goods through marketing channels. Thus, when fertilizer is purchased, the farmer has a greater degree of protection from unscrupulous sellers. If integrated production were to be established with the farm firm producing its own fertilizer, the desirable levels of quality control would no doubt be less than those presently imposed by law. Thus, the impetus for high lot-to-lot quality conformance has been from an

# Announcing the Revolutionary

## Raymond Rotomatic Packer



- Gravity Operated
- No electricity or compressed air
- Speed plus Accuracy
- Lowest Maintenance

**New  
Design  
New  
Principle**

Here is the machine that is changing all standards for accurately weighing and packing free-flowing materials in open-mouth multi-wall bags!

The Raymond Rotomatic Packer is fully automatic, all-mechanical, and requires no outside source of power such as electricity or compressed air. It combines gravity operation with the even balance scale principle that delivers simplicity of operation, accurate weights, and high rate of production.

Practical bagging rates are limited only by the operator's ability to feed bags to the filling tube. The Raymond Rotomatic Packer handles 50 lb. bags up to 100 lb. bags with equal ease. Bag size changes take less than 60 seconds and the first new size bag is correctly weighed.

Practical variances in material density do not affect the accuracy or operation of the Raymond Rotomatic Packer. The machine design limits material in suspension to a minimum, further improving weight accuracy.

No specialists are required to maintain and service the Raymond Rotomatic Packer. Scale assembly can be adjusted by regular scale mechanics and any competent mechanic can service the unit.

Engineering, operation, and installation details are available from any Raymond Representative. For more details and information, write or call the Raymond Office nearest you.



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Middletown, Ohio



institutional source rather than primarily from increased productivity.

Methods of inspection and penalties for deficiencies differ among states. For example, under the Illinois law (12) no tolerance is permitted in the determination of the plant food content. When a fertilizer is found to be deficient by the inspector, a hearing is held at which the violator is given an opportunity to present his case. The hearing officer decides whether prosecution should be instituted. In contrast, the state laws of South Carolina and Florida (7,11) specify tolerance levels (Tables 1 and 2). Further, the penalties for deficiencies are not uniform among states. Illinois (12) classes violators as guilty of a misdemeanor, with fines from 100 to 300 dollars. In Florida and South Carolina (Tables 1 and 2), restitution is made to the purchaser in the form of money payments equal to three times the value of the deficiency.

The fertilizer producer uses a combination of control in the manufacturing or mixing process to reduce variance and an intentional over-formulation. That is, once the acceptable odds of a legally deficient sample are established on the basis of penalties, loss of brand allegiance, etc., this level can be met at a minimum cost by comparing the cost of reducing variance by more precise production procedures with the cost of increasing the average level of the raw materials supplying that plant nutrient. This may be treated as a cost minimization problem of neoclassical production theory. Tables of sampling, reduction, and analytical standard deviations have been published (14).

In 1948 the extent of over-formulation was estimated to have been six million dollars for the entire industry (18). A notion of the magnitude of over-formulation may be gained by reference to Table 3. Over-formulation is in evidence, on the average, in all cases except the potash content of 5-20-20. Note also that the relative variation of the straight materials is less than that of the mixed goods. The class "mixed goods" does not include the products of local blending operations. Where a state chemist of 25 years ago might have found 30 percent of the samples deficient in one or more elements, today the figure is probably between two and five percent (9). Evidently the quality control exercised by manufacturers has increased markedly.

### Within-lot Homogeneity

The advent of bulk-blending or the local mixing of straight materials has focused attention on the attribute of uniformity of mixture within a given lot. The preliminary results of the TVA Illinois cooperative research project on bulk-blending indicate that substantial savings might be effected in the cost of fertilizer to farmers by the method of bulk-blending. However, the advertisements of the producers of chemically manufactured fertilizers and the bulk-blenders emphasize the relative importance of within-lot homogeneity. For example, an advertisement of a producer of a chemically manufactured fertilizer (16) states: "Blended Plant Foods Not Enough: Illinois Farmer Finds Difference Is Fifteen Bushels an Acre." The illustrated advertisement goes on to report how a Knox County, Illinois, farmer had applied a blended 14-14-14 to 15 acres of a 40-acre field and Smith-Douglass Pelleform 14-14-14 to another 15 acres, and had left 10 acres untreated as a check plot. The reported yields are as follows: Check—60.10 bushels per acre; Blended—75.45 bushels per acre; Smith-Douglass Pelleform—86.65 bushels per acre.

Another advertisement states: "All Grades of Swift's Plant Foods Are Flo-fusion Manufactured—Not Just Mixed" (6). Since the bulk-blenders are local merchants, they do not advertise in the large-circulation farm magazines. When blenders advertise in local newspapers, the price of straight materials and blending charge are emphasized rather than thoroughness of mix. One Illinois bulk-blender publishes a news letter in which the advantages of bulk-blending are presented along with comments on the advertising of the chemical fertilizer manufacturers (21).

Under Illinois law (12) the bulk-blenders are permitted to sell any grade of fertilizer without registering each separate analysis. The producers of ordinary manufactured fertilizer are required to register each analysis. The bulk-blenders must state the guaranteed analysis on the invoice accompanying mixed or bulk fertilizer.

Present sampling methods prescribed by the Association of Official Agricultural Chemists are not suitable for estimating within-lot homogeneity (1). The official methods require preparation of a composite sample from subsamples taken from a specified number of bags in the lot. The composite sample is

thoroughly mixed prior to reduction for laboratory analysis. Hence, any evidence of degree of homogeneity is destroyed. The procedure for bulk fertilizer is similar in that subsamples are taken from five different parts of each lot and then these subsamples are thoroughly mixed. The claims that the chemically manufactured product is more homogeneous are no doubt correct. But the critical question concerns the effect of changes in homogeneity on crop yield. In terms of Figure 1, interest lies in the technical basis of the shape of the curve in Figure 1B.

The marginal cost of improving homogeneity in Figure 1C by such procedures as ammoniation and granulation was probably rather high prior to investment in equipment. After investment, improvements in within-lot homogeneity come from better control of the production process and maintenance of quality in raw materials. For the blender, the marginal cost of improving homogeneity may mean choosing materials having similar particle size and density to prevent subsequent segregation, and running the mixer for the prescribed time.

The advertising previously referred to attempts to alter the nature of the quantity-quality relationship (Figure 1B) held by farmers. That is, given the quantity of fertilizer, what is the effect of "improving" within-lot homogeneity on crop yields? The producers of chemically manufactured fertilizers attempt to make farmers quality-responsive.

Public agricultural research groups have a responsibility to aid in resolving this problem. Clearly, there are degrees of uniformity of mix. An index of this uniformity needs to be developed. Sampling methods have been developed that are useful in estimating uniformity of mixture when the materials are unlike in particle size (10). As in rate of fertilizer application studies, experiments could be designed to show the effect of various levels of homogeneity of the fertilizer mixture on yield. Although estimating this relationship is a technical agronomic problem, the economic implications of such an experiment appear to be equal to those of fertilizer rate experiments. Distinctions would need to be drawn between row and broadcast application. Once the nutrients are in solution in the soil, small departures from a com-

(Continued on page 53)

# Arcadian® News

Volume 3

For Manufacturers of Mixed Fertilizers

Number 8

## This is the Year to Put More N in N-P-K

### TAKE ADVANTAGE OF LOW SOLUTIONS PRICES!

There is a growing demand for a higher nitrogen content in mixed fertilizers. This year, you are in a better position than ever before to supply this demand at a good profit. Nitrogen Solutions are selling at a low price. And the new, improved ARCADIAN® Nitrogen Solutions make it easy and practical to produce high-nitrogen fertilizers in regular mixing equipment.

#### More Nitrogen from Solutions

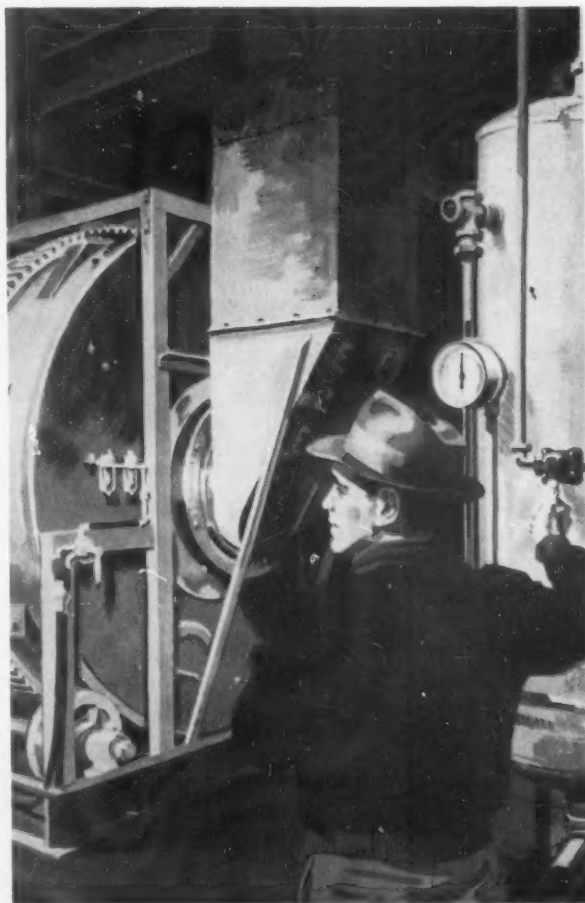
Many fertilizer manufacturers are now ammoniating normal superphosphate to a ratio of one unit of N for each two units of  $P_2O_5$  with all the nitrogen from ARCADIAN Nitrogen Solutions. They are able to obtain about half this ratio in triple superphosphate without the use of acids. Where a combination of normal and triple superphosphates is used in formulation, a ratio of one N to two  $P_2O_5$  is easy to obtain by the use of small amounts of sulfuric acid.

This year it will pay you to ammoniate your superphosphate with all the nitrogen it will carry. For example, you may find it profitable to produce 6-12-12 fertilizer rather than 4-12-12 fertilizer. Either of these fertilizers can easily be produced with all the nitrogen from ARCADIAN Nitrogen Solutions.

#### Low Extra Cost

The only extra cost of the 6-12-12 over the 4-12-12 is the delivered cost of two units of nitrogen in ARCADIAN Nitrogen Solutions. On this basis, it will pay you to figure out how much more profit you can make by producing and selling the higher nitrogen fertilizer. Increasing the nitrogen content of your

*(Continued on following page)*





(Continued from preceding page)

fertilizer involves proper selection of the Nitrogen Solution that is adapted to your methods, materials, equipment and the formulas you wish to produce. There are Solutions to fit your needs in the big line of ARCADIAN Nitrogen Solutions. Get the advice of a Nitrogen Division, Allied Chemical, technical service man.

He will tell you how to produce high-nitrogen fertilizers with maximum amounts of nitrogen from Nitrogen Solutions, whether you produce pulverized or granulated fertilizers. He is familiar with the techniques involved in producing all grades of mixed fertilizer, including 1-2-2, 1-1-1 and 2-1-1 ratios.

#### **Greater Profits**

At the present low price of Nitrogen Solutions, this is an opportune time for you to take advantage of the trend toward higher nitrogen fertilizers. State colleges are recommending more nitrogen in fertilizers. Farmers are more familiar with the benefits of such fertilizers than ever before.

Production of high-nitrogen mixed fertilizers will enable you to supply a bigger share of your customers' total plant food needs with mixed fertilizers. You will be diverting business from straight materials into more profitable mixed fertilizers. Compare your profit per unit of nitrogen in straight materials with your profit per unit of nitrogen in mixed fertilizers.

When you balance your mixed fertilizer with adequate nitrogen to meet crop requirements, you increase the farmer's profit, your dealer's profit and your own profit. You put a greater dollar volume of tonnage through your plant and save money in storage and shipping costs per unit of plant food. You help your dealer to supply the farmer with his plant food needs in a one-sale one-package deal. This builds exclusive customers and repeat sales.

#### **Ask Nitrogen Division**

For the 1958-59 fertilizer year, plan now to produce and sell a bigger tonnage of high-nitrogen mixed fertilizers. For technical help on the production of these fertilizers, contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y. This service is available to customers without charge.

*For years we have suspected that fertilizer use is related in some way to crop disease and insect problems. USDA tests at Beltsville now show that insects are easier to kill on properly-fertilized plants.*

## **Technical Tips**

### **PUT HEAT TO WORK for Better Granulation**

Many fertilizer manufacturers find that the best granulation is achieved by controlling reaction heat so that the temperature of the mass is higher than 200°F as it leaves the ammoniator. They feel that the results are well worth the extra cost and effort involved. For example, in this method, sulfuric acid—which reacts with about twice as much

heat as does superphosphate—is used in much greater quantities than would be required for neutralization alone.

Within practical limits, raising the temperature level brings the mass to granulation with less water content. The earliest point in most granulating processes where heat can be substituted most effectively for water is in the ammoniator. Thus, the ammoniator—in addition to conditioning—can deliver the mass to the dryer at higher temperatures and lower moisture content. This, in turn, lessens the load on the dryer.

Nitrogen Division, Allied Chemical, supplies several nitrogen solutions that raise heat in the ammoniator, as well as several that hold temperatures to the lower levels that some producers prefer. Make your own choice of granulation processes, but be sure to follow time-tested principles that always have resulted in the safe, efficient use of ingredients for higher rates of ammoniation.



## **Demonstration Sells Pasture Fertilizer**

Often a simple demonstration on a small acreage is the best way to convince a farmer that it pays to use plenty of fertilizer. For example, one Indiana farmer is now buying a lot of pasture fertilizer because a fertilizer company agronomist placed a demonstration on the farmer's pasture last spring.

On May 23rd, 100 pounds of nitrogen per acre was spread on a test area of the pasture. By June 20th, the nitrogen top-dressed sod had produced 9½ tons of green feed per acre, containing 3,800 pounds of dry weight averaging 22% protein. His unfertilized grass averaged 4½ tons of green feed per acre, containing 1,800 pounds of dry weight averaging 15% protein.

In one month, an investment of \$12 for nitrogen top-dressing produced 2,000 pounds more dry weight and 566 pounds

more protein per acre. This big return, within one spring month, sold the farmer on pasture fertilization.

As a result, he tested his soil and now uses complete fertilizer on all of his pasture. With the help of fertilizer, he was able to reduce the size of his pasture from 110 acres down to 80 acres. With fertilizer, the 80 acres now supply 130 head of cattle all the good green feed they can eat. He now estimates that fertilizer will produce two to three extra tons of dry weight per acre for the whole season, in addition to greatly increasing protein content.

Thus a simple demonstration made a good customer out of a farmer who never believed in pasture fertilization until he saw what it would do on his own farm. Demonstrations pay fertilizer men and farmers.



## It Pays to Make Fall a Big Selling Season

If the present trend toward spring and fall use of fertilizer continues, the industry may soon be solidly established on an efficient two-season basis. Producers will be able to apportion production, sales and deliveries over the entire year rather than concentrate on a few hectic months followed by relative inactivity. Aside from the increased tonnage sold, the resultant economies of time and labor cannot help but benefit the fertilizer manufacturer.

In the past, small grains, pastures and vegetables have accounted for most of the fertilizer sold in the fall. But in recent years farmers have been using fall fertilizer on more and more cropland.

### The Soil Stores for the Future

Farmers are coming to realize that many soils will hold plant foods over the winter. Retention of phosphorus and potash has always been excellent. And, except for sandy soil in heavy rainfall areas, nitrogen storage in the soil is also practical where winters are cold. In fact, it is becoming commonplace to use high-nitrogen fertilizers for fall plowdown of crop residues, and on sod, cover crops and small grains.

### Makes for Better Farming

Virtually every crop can benefit from fall fertilization. Most corn land would be improved by use of fertilizer in fall plowdown. Agronomists even advise fall application of phosphate-potash mixtures on land to be planted in cotton and sugar beets—especially where there is a

cover crop. With alfalfa, fall application of fertilizer high in phosphate and potash helps maintain thick stands and contributes to profitable yields. There are also many fruit crops that benefit from fertilization in the late fall.

It is the opinion of experts that fertilizer should be spread on hayland and pasture in the North during late fall, so that plant food will be stored in the roots for an early spring start. The oats, wheat, rye and other grazing crops of the South need heavy fall fertilization to provide pasturage along with a profitable grain crop. In other winter grain areas, using all the fertilizer in the fall produces as big a yield as would be obtained from split or spring application.

Fall, with its dry ground and slack time is the ideal time for spreading fertilizer by truck or some other simple, fast, low-cost method. Conversely, spring, with its labor shortage and pressure of activity is a less favorable time to plow down fertilizer.

### Big Future for the Industry

Fall fertilization has been adopted by thousands of leading farmers. News of their excellent results attracts new converts every year, but producers can do much to accelerate the process and reap the bigger profits just over the horizon. Think of the tremendous potential fall market in just the corn, small grains, vegetables, fruit, pasture and hay crops now grown on soil that could use fertilizers in the fall. Get closer to your share of it by aggressive promotion of fall fertilizers. Why not start now!

## Agronomic Notes

If every field on every farm had a test strip where the crop was fertilized according to experiment station recommendations, your dealers and salesmen would be too busy selling fertilizer to organize a field day.

Lacking this ideal demonstration situation, the tissue test kit still gives your men a graphic way to dramatize the need for fertilizer in any field right now. Quick chemical tests on the tissue of the growing crop show in minutes whether the plant contains enough fertilizer elements for good growth and yield.

True, you'll sell more fertilizer immediately only where the crop can be top-dressed, or where the farmer has an irrigation system. But the tissue test is a vivid reminder. Most farmers who see it use more fertilizer either right away or in the next season.

Almost every farmer has used some fertilizer. A profitable way to translate this fact for action is the saying "using a little fertilizer is like flying on one wing." When we show people the value of fertilizer, we do best by showing the value of plenty of fertilizer.

*"Double and nothing" is a good rule to follow in planning fall pasture fertilizer demonstrations right now. If 500 pounds of fertilizer per acre is the recommended amount used on the field, one strip should get 1,000 pounds of fertilizer and one strip should get none.*

Heavy rains on the eastern seaboard have leached away much nitrogen and magnesium. Rutgers University reports that up to 75% of the nitrogen and magnesium applied before Easter has disappeared from the fields, and 50% of these nutrients were lost from fertilizer applied up to May 4. They recommended an additional 50 to 75 pounds per acre of nitrogen for potatoes and 25 to 50 pounds for vegetables.

A long-lasting, slowly-soluble form of nitrogen such as ureaform in mixed fertilizers helps prevent such a situation. Mixed fertilizer made with N-dure® solution and urea provides this lasting ureaform nitrogen. Other nitrogen materials provide quickly available plant food. Your mixed fertilizers made with N-dure feed crops well even if heavy rains come so late in the season that side-dressing is impossible.

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<b>NITRANA®</b>									
<b>2</b>	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
<b>2M</b>	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
<b>3</b>	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
<b>3M</b>	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
<b>3MC</b>	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
<b>4</b>	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
<b>4M</b>	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
<b>6</b>	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52
<b>7</b>	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
<b>URANA®</b>									
<b>6</b>	42.0	19.5	66.3	6.0	8.2	9.3	1.178	10	34
<b>10</b>	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
<b>11</b>	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
<b>12</b>	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	-7
<b>13</b>	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
<b>15</b>	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
<b>U-A-S®</b>									
<b>A</b>	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
<b>B</b>	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
<b>Anhydrous Ammonia</b>	82.2	99.9	—	—	—	24.3	0.618	211	—

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# Traffic Lights

## for Farm Lands?

This long-range planning, reported in New York Experiment Station's summer Farm Research bulletin, is a unique program which could do much to help avoid a critical shortage of high-yielding crop land in the years ahead. As our readers know, from articles we have published in recent months, an alarming number of our best-producing acres are being gobbled up by urban expansion, highway construction and industrial development. Adoption of similar planning techniques by other states could provide a blueprint to guide civil engineers around valuable farm sites in the future.

by K. C. NOBE, E. E. HARDY, and H. E. CONKLIN  
N. Y. Department of Agricultural Economics, Ithaca

The land economists in the Department of Agricultural Economics at Cornell have a large map of New York State on their wall these days. They put this map together about a year ago. Since then they have been coloring it, block by block, using traffic-light colors: red, yellow, and green. Red represents the areas they describe as submarginal for farming. Yellow areas are suited to farming under present price conditions, but incomes are modest. Green marks the areas where farms have good buildings, fields that are well laid out and in a good state of fertility, and land that is responding well enough to make these investments really profitable.

The green areas, when the map is finished, will include about two-thirds of the commercial farms in the State. These are the farms that will "go ahead" as further progress is made in agriculture.

A few of the farms in yellow areas can be improved profitably, but improvements will require heavy capital investments in such items as buildings, fences, drains, lime, and the like. Most of the farms in the yellow areas have land that is too steep, wet, acid, or droughty, or growing seasons that are too short, to justify many improvements. Some farms in the yellow areas will become submarginal as farmers in the green areas increase their output by taking advantage of new techniques.

Farms in the red areas are mostly part-time farms at present. Land is decidedly unresponsive in these areas, and buildings, fences, and other improvements are out-of-date and in poor repair. The cost of enlarging and modernizing farm improvements would be so great in the red areas that even the moderately responsive lands in this class are expected to go completely out of commercial farming as individual farm units. In some instances, some

of the land in this class will be combined with farms in yellow or green areas.

Areas that are completely out of farming at the present time are being left white on the map. Some of these are urban and suburban areas. Others are abandoned farm lands.

The research workers are getting information from many sources for making their map. They are also traveling many miles of rural roads. Recent aerial photographs have been purchased for 30 counties of the State. Last summer the workers traveled 12,000 miles in a mobile laboratory. They examined the farms shown on about 25 per cent of the photos, making a continuous verbal record of everything they saw. They are now studying the airphotos, with their notes, and making a complete classification of all the farms that are covered by the pictures.

Sometime within the next 2 years a map will be published for the 27 counties including and west of Oneida, Chenango, and Broome. Recent airphotos are available for only a few counties in the rest of the State, so work will proceed more slowly in mapping the other agricultural counties.

These maps will be useful to farm people in many ways. A person starting farming can use them to pick areas where the chances are best for getting a good farm. Farm groups will find them helpful in planning long-range extension programs, in evaluating various possible types of vocational training for their high schools, and in planning expansions of their cooperative organizations. Government agencies concerned with agriculture can use the maps as a basis for planning their programs. And research at the College of Agriculture can be tailored more nearly to the individual problems of particular areas.

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## Fertilizer Safety Schools

### Begin In August

The first of five two-day regional accident prevention schools, sponsored by the Fertilizer Section of the National Safety Council with support of the National Plant Food Institute, will be held for the Northeast Region at Statler Hall, Cornell University Campus, Ithaca, N. Y., August 14-15, Paul T. Truitt, executive vice president of the institute has announced.

The program for the school at Ithaca, with Stratton M. McCargo, G.L.F. Soil Building Service, a Division of Coop. G.L.F. Exchange, Inc., Terrace Hill, Ithaca, N. Y., in charge, follows:

Thursday, August 14—8:30 to 9:30 a.m., registration and distribution of materials; 9:30 to 10:00 a.m., conference opening, George F. Dietz, General Chairman, Fertilizer Section, National Safety Council; Plans for the Course, Robert F. Risley, Coordinator of Special Programs; 10:00 to 11:00 a.m., "The Supervisor as a Teacher and Leader" Robert F. Risley, Coordinator of Special Programs; 11:00 to 12:00 noon, "Know Your Accident Problems" E. O. Burroughs, Jr., Insurance Department, F. S. Royster Guano Company; 12:15 to 1:15 p.m., Luncheon, North Room, Statler Hall; 1:30 to 2:00 "Accident Investigation" William Creel, Department of Labor, North Carolina; 2:00 to 2:45 "Safety Education and Training" Albert Martin, Director of Industrial Relations, Adding Machine Division, National Cash Register Company; 2:45 to 3:00 p.m., Break; 3:00 to 3:45 "Safe Use of Liquid Materials in a Fertilizer Mixing Program" Elmer Perrine, Technical Advisor, Allied Chemical Corporation; 3:45 to 4:30 p.m., "Fertilizer Insecticide Mixtures" John S. Mark, Production Manager, Farm Bureau Co-op Association of Ohio; 5:30 to 6:30 Reception, Faculty Lounge, Statler Hall, 6:30 p.m., Dinner, Faculty Lounge, Statler Hall "New York State's Approach to Accident Prevention."

Friday, August 15—9:00 to 9:30 a.m., "Safety Organization" Albert Martin, Director of Industrial Relations, Adding Machine Division, National Cash Register Company; 9:30 to 10:00 a.m., "Materials Handling and Storage" Jacob Gold, Safety Consultant, U. S. Department of Labor; 10:00 to 10:30 a.m., Break; 10:30 to 11:00 a.m., "Housekeeping" E. O. Burroughs, Jr., Insurance Depart-

ment, F. S. Royster Guano Company; 11:00 to 12:00 noon "Developing a Workable Formal Safety Program for the Small Mixing Plant" Carl Gillmeister, Assistant Production Manager, G.L.F. Soil Building Service, and panel of speakers; 12:15 to 1:15 p.m., Luncheon, North Room, Statler Hall; Adjournment.

The headquarters for the Ithaca, N. Y., school will be in Statler Hall with registration beginning at 8:30 a.m., on August 14. The fee will be \$20 per person, covering two lunches, one reception and dinner.

"Today, there is an urgent need to reduce all costs throughout the fertilizer industry," Mr. Truitt said. "The schools are designed to cut the industrial accident rate and to conserve resources. Participation in these schools by all manufacturers in the industry is indeed warranted."

Mr. Truitt announced that W. C. Creel, Safety Director, North Carolina Department of Labor, Raleigh, will be in charge of instruction for the schools. Teaching materials will be furnished by the National Safety Council, U. S. Department of Labor, and the Bureau of Labor Standards. Subject matter will include a clinic on current problems brought up by those attending and such broad areas as safety organization, materials handling and storage, housekeeping, and educational and training programs.

Mr. Creel will be assisted by expert safety men from the industry, from the Universities and from the National Safety Council.

Regional Directors of the Institute cooperating in promoting the schools include: Dr. W. H. Garman for the Northeast Region; Dr. Samuel L. Tisdale for the Southeast Region; Zenas Beers, for the Midwest Region; Dr. Robert L. Beacher, for the Southwest Region; Dr. Richard B. Bahme for the Western Region; and F. Todd Tremblay for the Pacific Northwest Region.

The four other schools with names of representatives of the Fertilizer Section, National Safety Council, in charge are: 1. Atlanta, Ga., Quentin S. Lee, The Cotton Producers Association, Atlanta, Ga.; 2. Chicago, Ill., John E. Smith, Spencer Chemical Company, Pittsburg, Kansas; 3. Austin, Texas, A. I. Raney, Phillips Chemical Co., Bartlesville, Okla.; 4. San Francisco, Cal., (Tentative Chairman to be named later).



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# HONORS

## Penn State Honors Geiger

Marlin G. Geiger, executive vice president, W. R. Grace & Co., was honored by Pennsylvania State University.

He was presented with a "Distinguished Alumnus Award" for "his innumerable contributions to the world of chemicals; for his abiding belief that responsibility makes an industry important and importance widens that responsibility; for his great sensitivity in philanthropic and community affairs; for a love of learning, living and doing that abounds with the years."

## Dr. Swanson Honored By Alma Mater

During Commencement activities at Coe College, Cedar Rapids, Iowa, Dr. C. Loyal W. Swanson was honored with an Alumni Award of Merit presented in recognition of "his outstanding contribution to the field of Science." He was the youngest of five graduates to receive this recognition and honor. Dr. Swanson is the agronomist for Texaco with headquarters in Chicago.

Dr. Swanson twice has received recognition from the American Society of Agronomy for his research in soils. In 1951, the society presented him with their Stevenson Award and a \$500 honorarium. In 1956, he was elected a Fellow of the Society.

## Walters Gets IMCC Award

Frank S. Walters, production superintendent in the Plant Food Division of International Minerals & Chemical, has been awarded the company's 45-year merit pin. The presentation was made by Thomas M. Ware, company president.

Mr. Walters came to Chicago in 1949 as production supervisor in charge of output as International's eleven northern plants manufacturing fertilizers and farm chemicals; he had formerly been plant superintendent at the company's Augusta, Georgia, installation. He joined IMC as a clerk in East Point, Ga., in 1913, and later was promoted to foreman at the Columbus, Ga., plant before going to Augusta.

## K. D. Jacob Wins 1958 AOAC-Wiley Award

Kenneth D. Jacob, Chief, Fertilizer Investigations Research Branch, Soil and Water Conservation Research Division, U. S. Department of Agriculture, has been selected to receive the 1958 Harvey W. Wiley Award of the Association of Official Agricultural Chemists. This award was established in 1956 to honor the father of the original Pure Food and Drug Law and the founder of the Association. The award consists of



Jacob

\$500 which goes annually to the scientist who makes an outstanding contribution to the development of methods for the analysis of foods, drugs, cosmetics, feeds, fertilizers, pesticides, or for use in general analytical chemistry.

Announcement was made by Frank A. Vorhes, Jr., Director, Division of Food, Food and Drug Administration and President of the Association of Official Agricultural Chemists. Mr. Vorhes stated in notifying Mr. Jacob of his award:

"Your forty years of scientific service in the public interest has been impressively productive toward objectives of the Association in the fields of fertilizer technology and analysis. Your contributions to understanding of the role of phosphates in fertilizer utilization have immeasurably benefited not only American agriculture, but the welfare of man throughout the civilized world. The fundamental principles you have elucidated for phosphate analysis of fertilizers furnish also the basis for methods applicable to many other materials with which the Association is concerned."

Mr. Jacob began his professional employment as a chemist in the Chemical Warfare Service of the U. S. Army in 1918 and joined the Department of Agriculture and started his studies on phosphate fertilizers in 1919. Mr. Jacob received the Superior Service Award of the Department of Agriculture in 1947, "for his research on world phosphate resources, technology and the initiation and use of the one-step thermal method of producing available phosphate material from raw phosphate." He has served the U.S. Government on a number of occasions as member of technical missions and delegate to international

conferences on fertilizers. He has published over 150 papers on methods for laboratory evaluation of fertilizers, agronomic evaluation of fertilizers, chemical composition and physical nature of natural phosphates, fertilizer technology, with particular emphasis on the solubilization of phosphate rock by thermofluorination, and resources, production, marketing, and uses of fertilizers.

## Carr G-M of British Groups

J. B. Carr has been appointed general manager and secretary of the British Fertiliser Manufacturers' Association in succession to the late Dr. G. F. New. Mr. Carr has also been appointed secretary of the Superphosphate Manufacturers' Association.

## Winners Of Association Awards

**California:** Wayne Ahlers, a vocational agricultural student at Yuba College, Marysville, California, was named winner of the Grand Award in the 1958 California Fertilizer Essay Contest, it was announced by the California Fertilizer Association. He will receive a check for \$100.00, and Yuba College will be given the perpetual trophy for the coming year.

In addition to the Grand Award to Ahlers, a check for \$25.00 will be sent to the author of the best essay in each other competing school. These award winners are: Ignacio Oropeza, Fullerton Junior College; Melvin Corbin, Modesto Junior College; Barbara Lantz, Orange Coast College, Costa Mesa; Dennis Lunetta, Pierce College, Woodland Hills; and Paul Winkelaar, Ventura College.

**North Carolina:** James W. Hendrix was selected as the outstanding student at North Carolina State College of Agriculture to receive the 1958 "National Plant Food Institute Agronomy Achievement Award." The selection was made by a faculty committee of the College and is based on academic achievement, extra-curricular activities, and the promise which the recipient shows for future contributions to the field of agriculture.

The award consists of a plaque inscribed with the name of the student so honored, an engraved key, and a cash prize of \$200.

# Liquid Fertilizers

from

## Diammonium Phosphate

by  
JULIUS SILVERBERG  
and  
GEORGE HOFFMEISTER, JR.  
Tennessee Valley Authority  
Wilson Dam, Alabama

Diammonium phosphate, as made from electric-furnace phosphoric acid and ammonia by several companies, is finding increased use as a fertilizer material. Its use alone and in formulation of dry-mixed and granular mixed fertilizers has been described (References 1, 2, 3). This material also is excellent for use in the production of liquid fertilizers. It contains 21% nitrogen and about 53.5%  $P_2O_5$  and is completely water soluble. Many of the popular grades of liquid fertilizers can be made with diammonium phosphate although in some ratios it may be necessary to decrease the grade slightly to avoid salting out at atmospheric temperatures. The following factors favor the use of diammonium phosphate in the production of liquid fertilizers:

1. It dissolves in water readily to form an essentially neutral solution (pH, 7.8). Only the simplest, low-cost equipment, such as a stirrer and a mild steel or wooden tank, are required. There is no need to provide facilities for storage and handling phosphoric acid or ammonia.

2. A variety of popular ratios and grades of liquid fertilizers can be made from diammonium phosphate and other raw materials such as urea and potassium chloride without the need for handling acid and ammonia.

3. Diammonium phosphate can be purchased in many locations for less than the cost of equivalent quantities of conventional electric-furnace phosphoric acid and ammonia. In these locations, the production costs of liquid fertilizers made from diammonium phosphate would be lower.

Table 1 gives formulations and results of tests in which several grades of liquid fertilizers were made from diammonium phosphate by the Tennessee Valley Authority at Wilson Dam, Alabama. Other raw materials were potassium chloride (white, 62%  $K_2O$ ) and urea (unconditioned, 46.5% N). All the grades shown were stored for 30 days at 70° F. without crystallizing, and only the 7-14-7 crystallized when stored at 28° to 32° F. for 7 days. As shown in the following tabulation, salting-out temperatures of a number of the grades were about the same as for the same grades made from furnace acid, aqua ammonia, urea, and potassium chloride.

Grade	Salting-out temperatures, °F., of liquid fertilizers based on	
	Diammonium phosphate	Electric-furnace orthophosphoric acid
9-9-9	+16	+15
6-12-6	+3	+2
5-10-10	+23	+21

<sup>1</sup>Supplemental nitrogen as urea.

The liquid fertilizers were made in the laboratory by adding solid diammonium phosphate, urea, and potassium chloride to water that was at a temperature of 60° F. or 100° F. with agitation. Because of the negative heats of solution of these ma-

terials, the temperatures of the solutions decreased 9° to 35° F. When 60° F. water was used, all the materials dissolved in 5 to 45 minutes. With 100° F. water, the time was generally 15 minutes or less. The solutions had a perceptible odor of ammonia but no measurable loss is expected under normal storage conditions.

The potential economic advantage of using diammonium phosphate in the production of liquid fertilizers in some locations is illustrated in Table 2, which compares the costs of raw materials for 5-10-10, 7-14-7, and 9-9-9 grades based on diammonium phosphate and on furnace acid and ammonia. The location of the liquid fertilizer plant was assumed to be Louisville, Kentucky. The costs of raw materials were taken to be the f.o.b. market prices of commercial producers plus freight from the nearest producing point.

Based on these assumptions, the formulation costs for the 5-10-10, 7-14-7, and 9-9-9 grades made with diammonium phosphate were \$3.73, \$5.26, and \$3.30 per ton lower, respectively, than for comparable grades made with furnace acid and ammonia.

Other tests showed that urea—ammonium nitrate solution (32.7% urea, 42.2% ammonium nitrate) also can be used satisfactorily with diammonium phosphate to produce liquid fertilizers. Grades that stored for 7 days at 28° to 32° F. without salting out were 7-7-7, 6-12-6, 5-10-

Table 1. Data on Liquid Fertilizers Made from Diammonium Phosphate

	PLANT FOOD RATIO							Straight
	1:1:1	1:2:1		1:2:2	4:10:7	1:1:0		diammonium
Grade (N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O)	9-9-9	6-12-6	7-14-7	5-10-10	4:10:7	12-12-0	13-13-0	phosphate
Formulation, lb./ton								
Diammonium phosphate (TVA crystal; 21.0-53.5-0)	337	449	524	374	374	449	486	572
Urea (unconditioned prills; 46.5% N)	237	56	65	47	4*	314	340	—
Potassium chloride (62.0% K <sub>2</sub> O)	291	194	226	323	226	—	—	—
Water	1135	1301	1185	1256	1396	1237	1174	1428
Approximate dissolution time <sup>2</sup> , min.								
(a) With water at 60° F.	25	5	45	15	5	20	30	5
(b) With water at 100° F.	15	5	25	15	5	15	15	5
Temperature drop during dissolution, <sup>2,3</sup> °F.	35	22	25	28	20	25	25	9
Salting-out temperature, °F.	+16	+3	+30	+23	+5	—6	+2	—
Results of storage tests								
(a) Storage at 70° F. for 30 days	OK	OK	OK	OK	OK	OK	OK	OK
(b) Storage at 28° to 32° F. for 7 days	OK	OK	Crystallized	OK	OK	OK	OK	OK

<sup>1</sup> Urea may be omitted from this formulation by using 381 pounds of diammonium phosphate and 1398 pounds of water.

<sup>2</sup> Based on laboratory tests with good agitation in well insulated vessel (Dewar flask).

<sup>3</sup> Temperature drops given are for initial water temperature of 60° F. Temperature drops were about 5 degrees greater in tests with water at 100° F.



**Table 2. Comparison of Costs of Liquid Fertilizers Made from Diammonium Phosphate and from Electric-Furnace Phosphoric Acid and Ammonia**

	Cost of raw materials, \$/ton			Formulations and costs per ton of liquid fertilizer					
	F.o.b.	Freight Delivered	Pounds	5-10-10		7-14-7		9-9-9	
				\$	Pounds	\$	Pounds	\$	Pounds
Liquid Fertilizers from Diammonium Phosphate—Louisville, Kentucky									
Diammonium phosphate <sup>1</sup>	100.00	8.00	108.00	374	20.20	524	28.30	337	18.20
Urea <sup>2</sup>	110.00	6.50	116.50	47	2.74	65	3.79	237	13.81
Potassium chloride <sup>3</sup>	22.00	18.50	40.50	323	6.54	226	4.58	291	5.89
					29.48		36.67		37.90
Liquid Fertilizer from Phosphoric Acid—Louisville, Kentucky									
Electric-furnace phosphoric acid <sup>4</sup>	84.00	17.00	101.00	367	18.53	514	25.96	331	16.72
Anhydrous ammonia	88.00	9.50	97.50	81	3.95	113	5.51	73	3.56
Urea <sup>2</sup>	110.00	6.50	116.50	72	4.19	101	5.88	258	15.03
Potassium chloride <sup>3</sup>	22.00	18.50	40.50	323	6.54	226	4.58	291	5.89
					33.21		41.93		41.20

<sup>1</sup> 21% N, 53.5% P<sub>2</sub>O<sub>5</sub>

<sup>2</sup> 46.5% N.

<sup>3</sup> 62% K<sub>2</sub>O.

<sup>4</sup> 54.5% P<sub>2</sub>O<sub>5</sub>.

10, and 11-11-0. The use of urea—ammonium nitrate solution instead of solid urea as supplemental nitrogen is economically advantageous, especially for grades of high N:P<sub>2</sub>O<sub>5</sub> ratio, because of the lower price of nitrogen as solution. If it is assumed that the price of nitrogen as solution is \$1.65 per unit and the price of nitrogen as urea is \$2.50 per unit, delivered, the cost per ton of plant nutrient in a 1:1:1 ratio would be

\$17 less when using urea—ammonium nitrate solution. A similar advantage would result from the use of urea—ammonium nitrate solution instead of urea in producing a 1:1:1 ratio fertilizer based on phosphoric acid and ammonia.

A liquid fertilizer of 8-24-0 grade (pH, 6.5) was made by adding phosphoric acid to a solution of diammonium phosphate to adjust the N:P<sub>2</sub>O<sub>5</sub> ratio. The proportion of acid

was such as to supply 15% of the P<sub>2</sub>O<sub>5</sub> in the product. By adding potassium chloride, a 6-18-6 grade was made. These formulations also would have an economic advantage in some locations over those involving ammoniation of phosphoric acid.

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## Nutrition — IT MAY BE THE KEY TO INSECT CONTROL

Preliminary experiments by U. S. Department of Agriculture scientists indicate the possibility of a correlation between giving plants the nutrients they need for optimum growth and successful control of spider mites attacking such plants.

The USDA scientists found that spider mites attacking pole lima beans were easy to kill with mala-

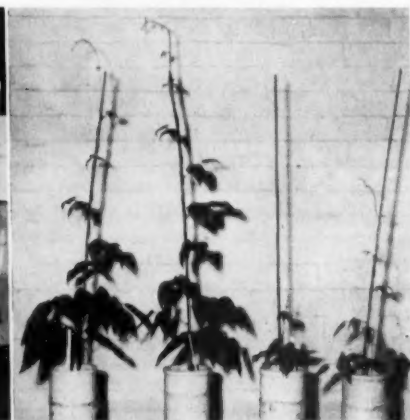
thion when the beans were supplied with proper amounts of nitrogen, phosphorus and potassium for good growth. But they found mites generally harder to kill on plants receiving either less or more than required amounts of each nutrient.

These experiments were conducted at USDA's Agricultural Research

Center, Beltsville, Md., by USDA entomologist Thomas Henneberry and plant physiologist N. W. Stuart.

The experiments indicate that resistance to insecticides noted in insects and mites may actually represent changes in susceptibility caused by variations in plant nutrient levels.

Subsequent experiments may help determine the advantage of timing insect control practices with seasonal variations of nutrients in plants. The continued research may also disclose why susceptibility of mites to an insecticide decreases when nutrient levels are above or below plant requirements. Further work will also include study of the possible effects on mite susceptibility of plant-growth variations produced by variations in light and temperature.



Pests may be harder or easier to kill depending on the fertilizer given host crops, according to preliminary studies made by entomologists and plant physiologists of the U. S. Dept. of Agriculture at the Agricultural Research Center at Beltsville, Md. Entomologist Thomas Henneberry counts the number of mites on leaves of pole lima beans that have been fed different fertilizers to determine differences in survival of mites. Mites are easier to kill with malathion on healthy limabean plants (left) fed enough nitrogen for good growth. They are harder to kill on plants (right) supplied no nitrogen.



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# Research

## Grants

**International Minerals & Chemical** has announced that its 1957-58 grant-in-aid program for research in plant nutrition and soil fertility totalled \$125,000 to 25 colleges and universities.

The allocation during the fiscal year just ended brings International's total for similar work to more than \$1,000,000 in the past 15 years. The grants are administered by the company's research division.

Corporation spokesmen said IMC-financed studies, under the direction of research scientists in schools receiving aid, were directed chiefly toward fundamental plant physiology and nutrient requirements.

Colleges and universities which received grants include:

University of Kentucky, Kansas State College, Texas A & M College, Mississippi State College, Virginia Polytechnic Institute, Penn State University, University of Rhode Island, University of Wisconsin, Michigan State University, University of New Hampshire, Alabama Polytechnic Institute, Purdue University, University of Missouri, Louisiana State University, Oklahoma State University, University of Illinois, University of Minnesota, North Carolina State College, University of Tennessee, University of Maine, Ohio State University, Washington State College, Cornell University, University of Florida, and University of California.

**National Plant Food Institute** in addition to the many grants-in-aid which we have announced here in recent months, have just reported partial support of work at Purdue on crop-response to fertilizer under irrigation.

Cooperating in the research program are Dr. D. Wood Thomas, and LaVon Smith, Agricultural Economics Department; and Dan Wiersma, Agronomy Department. The Agricultural Engineering Department will name a staff member on the project to succeed John R. Davis, who has left the University.

The research men are seeking answers to the problems of: (1) The least costly combination inputs of water, seed and nitrogen, phosphate and potash fertilizer to producing

desired crop output levels, and (2) the most profitable level of application of such inputs under various product price relationships.

Another previously unreported NPFI grant is the \$2500 awarded to the Davis Station of the University of California to support a graduate research fellowship in agriculture education during 1958-59.

The grant enables Roy Lippert, who was selected as the fellowship recipient to conduct a study on the effectiveness of demonstration plots as teaching aids.

Supervising the study is an advisory committee headed by S. S. Sutherland, chairman, Department of Education, Davis. Other committee members are: Dr. D. G. Aldrich, chairman, Department of Soils and Plant Nutrition; Dr. G. N. Davis, Department of Vegetable Crops; Dr. W. A. Williams, assistant professor of Agronomy; Torrey Lyons, Extension vegetable crops specialist and Byron J. M. Mahon, chief, Bureau of Agricultural Education, State Department of Agriculture.

Mr. Lippert will set up plant nutrition demonstration plots throughout the State of California and will work with vocational agriculture teachers and also with county farm advisors of the University of California Agricultural Extension Service.

## What's New In Research

**Virus** diseases in plants do not yield well to fertilization programs, according to University of Wisconsin research. They report that fertility conditions which are best for plant growth are generally best, also, for virus disease activity in the plants.

**Insect control**, on the other hand, according to preliminary experiments by USDA, may well bear a close relationship to plant nutrition. See photo and further discussion of this.

**A Wonder Machine** is being used by the University of Minnesota to help solve some perplexing soil fertility problems in their west central area. The machine applies anhydrous ammonia, solutions and solid nitrogen. It can also apply various starter mixtures, both liquid and solid in the corn row. It has corn

planting units, which can also be used for grain.

Used strictly for research, it supplies speed and uniformity which helps mightily in the research.

**Erosion** control via alfalfa enables Minnesota farmers to get a good forage crop, again according to the University. Experimentally they have kept fields in alfalfa for 7 years. Plenty of phosphate and potash fertilizer is important but extra nitrogen does not pay, they report. Most successful of many plant food treatments tested was 300 pounds of 0-20-20 in the Spring before seeding, with annual 200 pound applications from then on. They got 4.7 tons of forage per acre annually this way for 7 years.

They tested up to 1,000 pounds with no greater yield, nor did nitrogen or trace elements give extra yield. Application in Spring or Fall made little difference.

**Corn** raised for up to 10 years on the same field is also possible in many Minnesota areas. It calls for heavy plant food, up to 800 pounds of complete fertilizer per acre in the spring, a 200 pound treatment at planting time, and side dressing, but it works. They report as much as 20,000 plants per acre. Requirements in addition to the fertilizer: Minimum tillage and careful cultivation to protect soil structure; chemical weed control; chemical insect control to prevent build-up.

But rotation is still the best way on rolling land.

**Preliminary** results of controlled potash tests on potato crops in California's Kern County have been termed successful by University of California officials in charge of the program.

Effects of potash applications to prevent a type of physiological leaf roll and blackspot or stem end bruising in potatoes has been under study by the University for some time.

Dr. Oscar Lorenz, of the university, announced tentative results, but pointed out that final evaluation would have to await harvesting and marketing of this year's potato crop.

Frank McGrane, agricultural chemicals sales manager for American Potash & Chemical Corporation, said the company was "highly encouraged" by the results reported to date.

"One of the subjects under study is potash ability to prevent spoilage during transit to eastern markets,"



McGrane said. "Inasmuch as this may run as high as 30 per cent, it is extremely important that some way be found to cut it down."

♦  
**Lubbock** Texas AES is conducting grain sorghum tests using 15 different treatments, in addition to research on two types of row spacings. The objective—to lift production to 6500 pounds an acre, on mixed soils which are now producing around 5500 pounds.

♦  
**Range** fertilization demonstrations at California State Polytechnic College, San Luis Obispo, show continued profits year after year, according to CFA.

Detailed report on progress of the Cal-poly demonstrations given to the Sixth Annual California Fertilizer Conference, held recently on the campus at San Luis Obispo, by Dr. Logan Carter, head of the Soil Science Department.

Dr. Carter said that profits are shown during each succeeding year, "with considerable residual benefits regardless of total annual precipitation."

He also reported that "commercial fertilizers on range lands having conditions comparable to those of the San Luis Obispo area can be expected to give the land operator a satisfactory profit year after year."

### **Connecticut Bulletin Back In Print**

One of the all-time "best sellers" among Connecticut AES bulletins—The Morgan Soil Testing System—is again available for distribution. The bulletin is a technical handbook on chemical analysis of soils. It has been out of print for several months.

A charge of \$1 a copy to cover printing costs is made for the bulletin, No. 541. Address requests to Publications, The Connecticut Agricultural Experiment Station, New Haven 4, Connecticut.

### **Farm Language Dictionary Available**

Contains over 1,000 words and phrases commonly used by farm people with definitions and explanations. It is published by The Kentucky-Tennessee State Farm Paper unit and was prepared in collaboration with the editors of 17 other state farm papers.

This book is a newly revised and much enlarged edition of a giveaway booklet that proved highly popular with those engaged in writing and selling to the rural market.

It is pointed out in the introduction that farmers, like other workers in a specialized field, have a language all their own—a language almost entirely foreign to those who live in the city.

The dictionary is printed in easy-to-read type with defined words in caps and boldface, arranged alphabetically for quick reference. It is available from The Brook Department, Kentucky-Tennessee State Farm Paper Unit, Box 210, Middletown, Kentucky, and is priced at \$1.00.

### **Union Bag-Camp Opens New Lab**

Union Bag-Camp Paper Corporation has officially opened its new product development laboratory in Hoboken, New Jersey. It has been designed as the most modern clinic devoted to the diagnosis and development of packaging available to American industry. Its new facilities cover present and expected needs in all phases of packaging research and development. Among these are specialty bags, corrugated boxes, multiwall bags, bleached and processed paper and board.

### **Russians in Hot Pursuit**

The Russians report a soil preparation that will grow carrots three feet high . . . perhaps somebody slipped a little gibberellic acid into a USSR sub some time or other.

In June Premier Khrushchev talked about revamping the chemical industry of Russia, even to buying equipment in capitalist countries.

### **Feed Fertilizer Through Sprinkler**

Down in Arkansas, Billy Bryan of the AES is quoted in the press as proving you can run water-soluble fertilizer through a sprinkler system. Bulletin 598 tells all. Ask the University of Arkansas, Fayetteville, about it. Copies are free.

### **Cooperative Research On Air Pollution**

Seven major Florida phosphate companies have retained Resources Research Inc. to study air pollution problems in Polk County and Eastern Hillsborough. A laboratory staffed by 12 research men will be set up in Lakeland, headed by Eugene H. Krackow.

### **Short Mums from Amo-1618**

USDA reports that chrysanthemums may be cut down to table size by the use of Amo-1618. Stems will be short, but blooms will be normal. Beltsville has already grown mums to a variety of heights.

### **U. S. Gypsum Film Ready**

A sound slide film, "The Uses of Gypsum in Agriculture," is available from the United States Gypsum Company, Chicago, Ill.

The film, which describes the eight major uses of Ben Franklin Agricultural Gypsum, explains how it improves drainage of wet soils, clears muddy waters, breaks up plowpans and compacted soils, corrects irrigation waters, supplies neutral soluble calcium, conserves nitrogen in manure, supplies sulfate sulphur and stimulates soil microorganisms.

The film is available for loan to county agents, vo-ag teachers and farm groups upon request to Department 139, U. S. Gypsum Company, 300 West Adams Street, Chicago 6, Illinois.

### **New U. S. S. Pilot Plant To Study Gas, Coal Chemicals**

Full-scale experiments in preparing and blending coal for coke ovens and measuring the recovery of gas and coal chemicals will begin shortly at U. S. Steel's Clairton Works with the building of a pilot plant. F. A. Dudderar, general superintendent, has announced.

He pointed out that with the modern pilot plant it will be possible to carry on important coal preparation, coke and coal chemical research on a large scale for the first time in this country. He also predicted that utilizing the modern pilot plant facilities, improved techniques in coal preparation and the use of coke and coal chemicals could be anticipated.

The primary function of these ovens will be to process the entire charge of each test oven during its coking cycle in order to measure the recovery of gas, tar and liquor. In addition, approximately 10 per cent of the total gas will be withdrawn throughout the coking cycle for recovery of ammonia, naphthalene and light oil.



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raw materials*



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*Shipping  
finished product*



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**Accuracy** • Correct Analysis Assured . . . No Penalties . . . Nothing Given Away.

**Dependability** • Many Years Experience . . . Simple Design . . . Highest Quality Workmanship.

**Speed** • Geared to Your Requirements for Smooth Operation . . . Completely Flexible.

**Proof** • Satisfied Customers in the North, East, South and Midwest.

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## INGLETT & COMPANY, INC.

P. O. Box 3425

Augusta, Ga.

# PEOPLE in the Industry

## Allied Chemical

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White

White and Mr. Winfield have been Division vice-presidents. Wesley Wickersham, International Division vice-president, will be in charge of export operations.

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Agricultural Chemicals, Ltd. manufactures and sells Agrico, Zell's and AA fertilizers in Canada.

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William R. Siems has been appointed advertising manager of Bemis Bro. Bag Co., succeeding Garth D. Salisbury, resigned; and P. L. Wheeler has been appointed to the newly created post of supervisor, new product merchandising. Mr. Siems has been in the Bemis advertising department since 1955, and Mr. Wheeler joined Bemis in 1948. Both will be in the St. Louis offices.

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The election of Wm. M. Gatheral as treasurer was announced by Paul C. Williams, president of O. M. Scott & Sons, Marysville, Ohio.

Mr. Gatheral joined Scott in 1956. He succeeds Mr. Williams who held the positions of president and treasurer. He is the third president and treasurer in this grass seed and fertilizer company's history.

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The appointment of John C. Bennett as sales manager of American Cyanamid Company's agricultural division was announced by F. S. Washburn, division general manager. Mr. Bennett will have charge of the field selling organization as it pertains to all areas of agricultural activities. He will also be responsible for sales training. Mr. Bennett had been in charge of Cyanamid's phosphates sales for the past 12 years.



Bennett



Baldwin



McGough

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Both appointments are effective immediately, according to Robert S. Ray, vice president. Mr. McGough formerly was manager, Agricultural Chemical Sales; Mr. Baldwin formerly was manager, Industrial Chemical Sales.

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The appointment of Wayne P. Dean of Columbia, S. C. as Agricultural Plant Food Marketing Manager of Swift & Company's Agricultural Chemical Division was announced by W. F. Price, general manager. Mr.



Dean

Dean, 42, has been manager of Swift's plant food factory in Columbia. He succeeds W. J. Chapin, recently named head of the General Feed department.

Swift's agricultural chemical division, has made changes in the management of five plant food factories:

R. H. Woodward, of the Chicago general office staff, is manager of the Atlanta, Georgia, Division, and E. H. Rappe, formerly manager of the Atlanta plant, moves to Columbia, South Carolina, as manager.

Alf H. Oines, also of the Chicago staff, assumes management of the Baltimore, Maryland, Division succeeding A. W. Langdon who is transferred to Calumet City, Ill.

John A. Silkman, assistant manager at National Stock Yards, Illinois, becomes manager at Shreveport, Louisiana succeeding W. L. Gray who is transferred to Tyler, Texas, as manager of the East Texas Products Company division while R. M. Cole, acting manager at Tyler, will join the Chicago staff.

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Central Farmers Fertilizer Company has announced the appointment of Avery L. Stutts as manager of its Phosphate Works being constructed in Georgetown Canyon. Jos. J. Lanter, president of Central Farmers, also announced new responsibilities for Charles M. Miller, and confirmed the consolidation of Central Farmers with Western Fertilizer Association, adding Pacific Northwest agricultural cooperatives to Central Farmers organization.

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**Carey**



**Marshall**



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Robert J. Meier has joined their sales department at St. Louis.

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### Dr. Leyendecker

Dr. P. J. Leyendecker has been named assistant dean of agriculture and home economics at New Mexico A & M. He succeeds Dean Percy W. Cockrell, retired after 29 years service.

### Geigy

Geigy Agricultural Chemicals, division of Geigy Chemical Corporation, announces the appointment of Norman D. Thomsen as sales representative in the upper north central states, including Wisconsin, Iowa, Minnesota, North Dakota, South Dakota, Montana and north-eastern Wyoming.

Mr. Thomsen comes to Geigy from the Diamond Blackleaf Division of Diamond Alkali Company.

## changes

### Miller

Ramsburg Fertilizer of Frederick, Md. has been purchased by Miller Chemical & Fertilizer of Baltimore, and the complete Miller line went into production there July 1. This is the sixth plant being operated by Miller, but the Gaithersburg plant will be closed down and moved to Frederick. Gary Bell, Gaithersburg manager, will be transferred to Frederick. The 15 Ramsburg employees will be retained and others added.

### AP&C

American Potash & Chemical Corporation has moved its headquarters offices into a newly constructed building at 3000 West Sixth Street, Los Angeles. The new three-story building has a total of more than 40,000 square feet of office space.

Located there are all the company's executive offices including production, sales, administration, research, planning and development, defense and finance departments.

### Spencer

Spencer Chemical will be responsible for supervision of engineering, construction and operation of the new caprolactum plant near Ashland, Ky., which is the joint venture of Spencer and Industrial Rayon Corp. . . . a \$10,000,000 project, known as Ohio River Chemical Company.

John Edward Straub, formerly production chief at Spencer's Vicksburg works, has been named general

manager at Ohio River. The Vicksburg plant has been shut down, for an indefinite period because of excess inventories. "Due to adverse effect of competition with tax advantages not available to private enterprise companies such as Spencer," according to the plant manager W. A. Johnston.

### W. Va. P. & P.

Multiwall and grocery bag manufacturing operations are being established on the West Coast by West Virginia Pulp and Paper Company, it was announced by David L. Luke, president.

The facilities are located in a newly-constructed plant in Torrance, Calif., near Los Angeles.

Startup of the paper company's new bag operations is being expedited by the purchase of multiwall bag-making machinery from Fulton Container Co., Inc., of Los Angeles, which will continue its textile bag business.

The new West Coast operation will add a fifth unit to the company's Multiwall Bag Division, which currently serves markets east of the Rockies from four modern plants located at Wellsburg, W. Va., St. Louis, New Orleans and Mobile.

### IM&C

International Minerals & Chemical offices are now located in its new administrative center, Skokie, Ill. Old Orchard Road is the address, and the Skokie phone number is ORchard 6-3000, with a Chicago line, JUper 3-0700.

We have word that their Mulberry, Fla. office jurisdiction has been extended into Southern Alabama. E. Meade Wilson is manager.

### Mine Safety

Mine Safety Appliances Company is expanding the field sales and service organization of its technical products division to provide nationwide service on instruments and process control equipment. Nelson W. Hartz, sales manager of the division, has appointed a staff of specialists to serve all sections of the country. H. B. Stafford is operations manager of the division.

### Thornley

Sole Chemical Corp., Chicago producer of surfactant specialties, announces the appointment of the H. D. Thornley Company, of Wilmington, Delaware, as its technical sales representative for the eastern half of Pennsylvania, Delaware, Maryland, D. C., Virginia, West Virginia, and the south and west portions of New Jersey.

### O-I Expands Bag Plant

Installation of new equipment to increase the capacity of Owens-Illinois Glass Company's multiwall bag division plant at Valdosta, Ga., has been announced by Tom W. Brown, Jr., division manager.

When the modernization program is completed, Mr. Brown said, the Valdosta plant will rank with best-equipped multiwall bag plants in the packaging industry. He said the new equipment will result in "a substantial increase" in the plant's production capacity.

### Chain Belt To Centralize Manufacturing

Chain Belt Company, Milwaukee, Wisconsin, has just acquired 92 acres of land in Madison, Indiana, to provide additional manufacturing capacity for the company's heavy machinery lines. The site was chosen because of its commercial transportation facilities and its central location in relation to certain market areas. Construction of a new plant building, to start shortly, will permit consolidation of their present manufacturing operations located in Niles and Newton Falls, Ohio and Rock Island, Ill.

Chain Belt now operates plants in Wisconsin, Massachusetts, Illinois, Ohio, California and Canada, producing mechanical power transmission machinery, conveyors, and other machinery.

### Export Vital To Soybeans

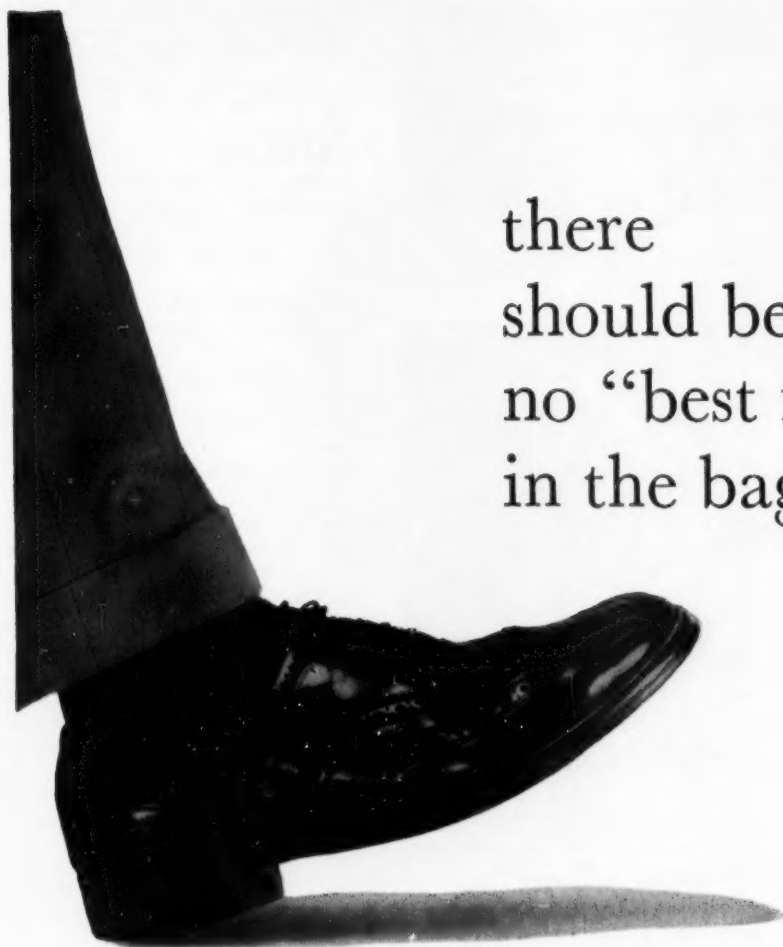
With almost 40% of U. S. soybeans now going abroad either as soybeans or as oil, foreign markets are playing a major role in the prosperity of soybean farmers. Soybean acreage is expanding again this year. To hold and expand export markets for soybeans and soybean products has become of vital importance to U. S. agriculture, the American Soybean Association program committee says.

## OBITUARIES

**Ted G. Ahlgren**, Waterloo, Iowa, division manager for Armour Fertilizer, died June 22. He had been with them since 1936.

**Edward H. Conroy**, 67, director of the Tennessee Corp. and chief of their research program, died July 2 in an Atlanta, Ga., hospital. He had been with them since 1926.

**Daniel S. Murph**, 79, with NFA from 1934 to 1950, retiring as secretary-treasurer, died July 5 of a heart attack in Winnsboro, S. C.



there  
should be  
no "best foot"  
in the bag business

Chase makes bags of all kinds—multi-wall paper, textile, Saxolin open-mesh, Polytex film, laminated, waterproof . . . consumer-size bags and larger.

Bag Plants and Sales Offices Coast to Coast  
—a nation wide staff of bag specialists

Putting the best foot forward may be good selling strategy, but the smart *buyer of bags* looks farther.

He knows, for example, that new "features" can be hamstrung or stymied by lack of interest or lax follow through

. . . that sharp, clear printing accomplishes nothing if bags aren't delivered on schedule.

. . . that utmost care in skilled manufacture means little if a different bag would do the job better.

When it comes to "best feet," you could call Chase a centepede, for good bags, Chase-designed to *your* needs — *properly made, promptly shipped* — reflect the competence of hundreds of specialists who constitute the progressive Chase family.

*Our 111th Year*

**CHASE**

**BAG COMPANY**

155 East 44th Street, New York 17, N. Y.



## Around the Map

### ARIZONA

Arizona Fertilizer has opened its eighth plant, this one in Willcox. Manager is Nick Borze a ten-year man with the concern.

### CALIFORNIA

California Ammonia's new NH<sub>3</sub> plant at Lathrop, a joint project of Best Fertilizers and 700 California farmers, to be managed by Best after completion which is expected to be in November. The compressors, air separation plant and the nitrogen washing unit are all completed, as are the ammonia reactivating tower and heat exchangers. All these are being shipped in and installed. \* \* \*

Calspray's Richmond plant has installed a 420,000 gallon stainless steel tank to hold nitric acid. Made by US Steel's Western division, this is said to be the largest tank of its kind in the world. \* \* \*

Best Fertilizers, Oakland, has announced a new formulation for their pelleted garden and lawn fertilizers. An 11-8-4 formulation, Best Pellets, include an addition of 23% soil conditioner, plus needed trace elements to correct soil deficiencies.

### FLORIDA

Armour's new plant at Haines City is due to be ready some time next month. \* \* \*

Tampa fertilizer plants were recently inspected by a group of Spanish fertilizer technicians, who toured IM&C, Gulf Fertilizer and US Phosphoric.

### ILLINOIS

International Minerals & Chemical, as part of a general program of expansion, set up on a long term basis, expect to expand their fertilizer facilities. This is especially true of their potash production. The \$25,000,000 potash mine in Saskatchewan, with which our readers are familiar, will play a big part in this.

### LOUISIANA

Ascension Fertilizer Company, Inc., fertilizer products, has been granted



With the word "Best" springing up mysteriously on hillsides throughout Northern California, people are wondering how anybody can so effectively "write a word in the grass." Actually, the words were put there by The Best Fertilizers Company, Oakland, which is as pleased as a schoolboy with the progress it is making with this new kind of writing. The company's new-formula pellets were used and within two weeks, the words were clearly legible.

charter of incorporation. Capital stock was listed at \$50,000.

### MISSISSIPPI

Mississippi Chemical has authorized a \$2,000,000 expansion program which will provide for production of solid urea, at Yazoo City, according to president C. S. Whittington. Construction of the urea plant is expected to be completed within the next fifteen months. The new facilities will provide approximately 100 tons a day of solid urea in addition to making available high nitrogen liquid fertilizers for direct application.

According to Owen Cooper, executive vice president of MCC, the new facility is being installed to keep MCC abreast with the latest developments in the technology of manufacturing solid and liquid fertilizers for the use of farmers. The new facility will increase the plant investment at Yazoo City to approximately \$20 million. \* \* \*

Styra-Soil, Vicksburg, is the brainchild of its president, F. N. Nelson, a florist. He discovered a way to keep styrafoam from getting sour when used to support flowers. Now

he has also added plant food, and is making a product in colored slabs which is now being distributed in 16 states—and in which house plants and cuttings can be rooted and grown.

### NEBRASKA

Gro-More Fertilizer Co., Genoa, has been incorporated with \$100,000 authorized capital. Incorporators: Lloyd Spackman, Paul and Keith Wheeler.

### PENNSYLVANIA

Olin Mathieson and Sun Oil are progressing with their plans to form a joint company and to build a 73,000 annual ton urea plant at Marcus Hook alongside Sun's ammonia plant.

### TENNESSEE

Samba Sales, Memphis, have announced plans to put out a new potting soil to be known as Samba Soil, according to president C. A. Meroney. It will be packed in three sizes each of polyethylene bags, multiwall bags and flower pots.

### BRAZIL

Fertiza, a Brazilian chemical concern, will shortly set up in Araxa, Minas Gerais, a plant to produce calcium phosphates to be used in conjunction with the phosphates of Pocos de Caldes as fertilizer. \* \* \*

Bayer de Brasil has completed its \$10,000,000 production unit at Rio, where pesticides will be part of the program.

### CANADA

Potash Co. of America reports that the potash found in its Saskatchewan operation is in all respects up to the quality indicated by the exploratory work. \* \* \*

Texas Gulf Sulphur and Devon-Palmer Oils are well under way with their \$8,000,000 sulphur extraction unit near Calgary.

### GREECE

The US is slated to grant \$12,000,000 to help build a 75,000 annual metric ton fertilizer plant in Greece, which will cost about \$23,000,000 and be completed about 1961.

### ITALY

Sicedison has been granted a concession on a Manfredonia wharf to cost \$1,250,000, to handle fertilizer and fertilizer chemicals to the tune of 100,000 annual tons.

### PAKISTAN

Multan Fertilizer Factory is now under construction, with completion due in 1961. It is to produce 1,003,000 annual tons of ammonium nitrate and 59,200 of urea.





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# New Fertilizer Plants Help Formosa Bolster Agricultural Output

With the help of aid funds from the U. S., Taiwan, the island bastion of Free China, is rapidly enlarging its fertilizer industry. The goal: self-sufficiency. The 13,000-square-mile island 100 miles off the China mainland supports a population of 10,000,000 with an arable land surface of only 4,000 square miles—the rest is rugged mountainous territory covering the central and eastern portions of the island.

Taiwan's principal crops are rice and sugar, the latter accounting for more than half of the island's foreign exchange since 1945. Both are exported in considerable quantities. Other crops grown are sweet potatoes, peanuts, pineapples, tea, bananas, and diverse vegetables.

To increase food production from a soil deficient in both nitrogen and phosphorus compounds, Taiwan needs fertilizers, which she both manufactures and imports. In 1956, Taiwan spent \$21,731,000 for 359,000 metric tons of imported fertilizers. Of this, 282,000 metric tons (costing \$18,370,000) were ammonium sulphate purchases from Japan. The remainder was mostly calcium superphosphate from Japan and potassium chloride from Germany and France, plus small quantities of phosphate-bearing rock from Morocco and the U. S.

Taiwan produced 311,000 metric tons of fertilizers herself in 1956, somewhat less than half her current requirements.

## Production Variegated

Three government-owned fertilizer companies are now in operation on Formosa: Taiwan Fertilizer Company, the largest, with five plants in production and one under construction; Kaohsiung Ammonium Sulphate Works, at the southern tip of the island; and Hwalien Nitrogen Fertilizer Works, on the east coast.

Taiwan Fertilizer Company (TFC)

has two plants at Keelung, Taiwan's northern port, producing respectively 33,000 metric tons per year of calcium cyanamide and 36,000 metric tons per year of superphosphate. TFC's Kaohsiung plant produces 49,000 metric tons of superphosphate per year. Her plant at Lotung produces 14,000 metric tons of fused phosphate per year; and the Hsin-chu plant produces 39,000 metric tons of calcium cyanamide per year.

Kaohsiung Ammonium Sulphate Works produces 70,000 metric tons of that material per year, while Hwalien Nitrogen Fertilizer Works produces an equal quantity of nitro-chalk, a mixture of ammonium nitrate and limestone.

Perhaps the greatest single step forward for the industry on Taiwan, however, is the one now underway: construction of TFC's sixth plant, which will produce coated fertilizer urea (containing 45% nitrogen) and uncoated industrial grade urea (containing 46.4% nitrogen). This plant alone, to be in production by summer, will represent an investment of \$29,000,000 of which \$17,000,000 will pay for imported equipment and the consultation and design

services of the Hydrocarbon Research Co. of New York. The new plant will add 800 workers to the 3,800 now on TFC's payrolls in its five plants. There are three eight-hour work shifts daily.

Hydrocarbon is furnishing engineering, procurement and construction supervisory services for the plant. Sub-designer of the urea section is the Vulcan Copper and Supply Company of Cincinnati, licensees of Inventa Process, a Swiss urea-production method. Gasification of coke and synthesis of ammonia will also be undertaken. Coke is available in Taiwan itself—and this will be the only raw material (plus air) needed in the process.

The plant is now going up in Nanking, seven miles from Taipei, Taiwan's capital. It will produce 84,000 metric tons of urea in coated form, considered the fertilizing equivalent of 180,000 metric tons of ammonium sulphate, now largely imported. Coated urea was chosen in preference to other fertilizers because of its nitrogen availability, resistance to moisture absorption, slow leaching qualities, ability to manufacture it without importing raw material, and savings in bagging, warehousing and transportation expense due to high concentration.

Industrial grade urea, to be produced in limited quantities at first, will be used in ammoniated toothpaste, cosmetics, sedatives, barbiturates and in the manufacture of urea formaldehyde resins used in the production of adhesives and molded plastic products.

All equipment, with the exception of two German-made compressors, will be American.



Nanking works of the new urea plant now under construction near Taipei.

# The International Scene

## AUSTRIA

### Production, Consumption Up But Below Europe Average

Production of chemical fertilizers in Austria reached 786,024 metric tons last year, an increase of about 19% over 1956. The demand has increased by about 250% since the pre-war years of 1934 to 1938, yet consumption of nitrogenous fertilizer is much less (an estimated 14 kilograms per hectare) than the average in the European area (18.1 kilos). These figures are taken from a recent study about the production, consumption and export of nitrogenous fertilizer in Europe: Iceland consumed the most nitrogenous fertilizer per hectare with 93.7 kilo, the Netherlands were next with 82.4, followed by Belgium, Norway and the Federal Republic of Germany. (EDITOR'S NOTE—A hectare is approximately 2½ acres.)

## BRAZIL

### Petrochemical Growth Boosting Fertilizer Output

The manufacturing scene in Brazil indicates that the country now has a well defined petrochemical industry. Now being manufactured at Cubatao are organic fertilizers, ethylene, lamp black and styrene.

Other facilities are under way in the Sao Paulo environs. Slated for the future is a petrochemical area for the Petrobras refinery in Caixas, where the necessary hydrocarbons, a by-product of the 90,000 gallons of gasoline produced daily, will be channelized into the petrochemical industry. It is reported that several foreign firms are already interested in locating here.

## CANADA

### Consumption Changed, 80% is Mixed Goods

Canada sales of fertilizers in Canada totaled 808,251 short tons during the 1956-57 fiscal year, compared with 800,680 tons in the preceding year, according to the Dominion Bureau of Statistics. Approximately 80 per cent of the total was in the form of mixed fertilizers. The principal materials used as such were ammonium phosphates, ammonium nitrate, and normal superphosphate. Fertilizer sales have changed relatively little since the peak year of 1952-53 when 819,803

tons were sold. Of those materials which must be imported in large quantities, superphosphate and potassium muriate led in 1956 with 138,991 tons and 131,293 tons, respectively.

### New Fertilizer Act For Canada

A new Fertilizer Act, over-hauling the old one and bringing regulations up to date, went into effect July 1.

The Act was approved by Parliament in April, 1957, and the regulations authorized by Governor in Council in June of this year.

C. R. Phillips, of the Plant Products Division, Canada Department of Agriculture, explained that one immediate result will be to increase plant food content of some fertilizers because the regulations set a higher minimum standard.

This, he said, will tend to eliminate smaller volume grades of lower analysis.

Special attention has been given sale of fertilizers with a pesticide content. It will be possible for a farmer to obtain mixtures of fertilizers and pesticides, provided they contain pesticides of the type and quantity suitable for the purpose intended. Further, the farmer must be supplied with labelling and directions for use of the product.

The new Act was published in the *Canada Gazette* June 25.

### Davis Predicts Potash Exports

Canada's deposits of potash may run into billions of tons and eventually may become a major export item, Dr. John Davis predicted in his study of Canadian mining prospects.

Mining of huge deposits have already begun in southern Saskatchewan.

By 1980, Canada's mines may produce about 2,500,000 tons a year valued up to \$50,000,000. Dr. Davis estimated in his report prepared for the Gordon Economic Commission.

Potash has been found in relatively few countries. The United States now supplies about 90 per cent of North America's needs with Canada importing about \$4,000,000 worth annually. Now instead of importing Canada may soon be ready to export.

## COSTA RICA

### New Labeling Plan Now in Effect

Costa Rica recently revised its regulations for the labeling of fertilizers placed on sale in the country.

Packaged fertilizers must show on the package or on a label attached thereto the following information: name of manufacturer; name or trademark of product; number registered with the Costa Rican Directorate General of Agriculture and Livestock; chemical analysis, showing percentages of nitrogen, phosphorus expressed in phosphoric anhydride, and potassium expressed in potassium oxide.

No longer required is the Directorate's "seal of guarantee" as such, nor is the statement that the importer, or mixer, guarantees the analysis, as that is tacitly understood.

Bulk fertilizers must show the required information on certificates attached to accompanying invoices.

## ISRAEL

### Potash Production Rising, Seek New Export Markets

General Mordehai Maklen, director of the Dead Sea Potash Works, recently visited Italy and Great Britain in connection with the sale of potash from the Sodom potash works in those countries.

The company's output has risen steadily in recent months, having reached a new peak of 8,760 tons in April.

Considerable quantities of potash will soon be exported through the Israeli Red Sea port of Eilat, to Australia as well as to other Far Eastern destinations.

With work on a new jetty due to be completed in Eilat port before the end of this year, preparations are already being made for the introduction of a regular service from Eilat to the Far East by vessels of from 5,000-7,000 tons.

Plans for a deep-water port at Eilat, which are being prepared by the chief engineer of LeHavre, will be completed soon.

## INDIA

### Plan Aims to Triple Nation's Fertilizer Capacity

India's Second Five Year Plan, a blueprint for state development of major industry which will take ef-

fect when the present development program expires in 1961, calls for tripling the output of fertilizer, along with big increases in other industrial production.

The plan, sequel to one which has already consumed some \$1.2 billion in U.S. aid funds, again centers around boosting agricultural yields and personal incomes.

To boost agricultural production, the use of chemical fertilizer is to be popularized among the peasants. Within eight years, India hopes to produce about 1,000,000 tons of nitrogenous fertilizers each year.

## **IRELAND**

### **City Invites Fertilizer Manufacturers**

The city of Nenagh, County Tipperary, has invited fertilizer manufacturers along with other industrialists to study their "excellent factory sites, together with ample electric power, water, transportation, and other service facilities."

A copy of the brochure prepared by the Nenagh Chamber of Commerce is available upon request from the Investment Development Division, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C.

## **ITALY**

### **Capacity, Research Up But Market Rises Slowly**

Italy's chemical companies recently have expanded further their facilities for production of farm chemicals, evidencing confidence in continuing growth in demand for such products despite current low domestic farm purchasing power.

In the past, use of farm chemicals in Italy has failed to develop as rapidly as in the United States. One reason is the limited purchasing power of the farm population.

Nearly 40 per cent of Italy's population is engaged in agriculture, compared with 10 percent in the United States. But many of Italy's farm population are forced to work soil that is not very productive.

The result is that farmers generally have little money for chemicals and farm machinery—even though greater use would be definitely economic and would better their purchasing power.

Reflecting the problem in the domestic market is the fact that the total use of fertilizers has shown only limited growth. At the same time, there has been a definite trend toward use of fertilizer mixtures

containing all three primary nutrients.

Present productive capacity of nitrogen in Italy is said to be about 500,000 tons per year for both agricultural and industrial applications. Amount for export is estimated at about 115,000 tons.

The new ENI plant at Ravenna will boost output of nitrogen to about 600,000 tons per year, it is said.

Both Edison and Montecatini have added to present facilities and have built new plants for production of nitrogen fertilizers. Also, near Priolo, Sicily, the Augusta Petrochimica Co. is now completing construction of a new synthetic ammonia plant whose product will be used in the production of fertilizers.

With the exploitation of potassium mines discovered some time ago in Sicily, further development of the utilization of potassium fertilizers is expected. In the past, all potassium fertilizers have been imported.

While domestic phosphate fertilizer consumption has been lagging lately, the export-import picture in this material is more favorable.

Against imports of about 4 billion lire in 1957, exports are said to have reached a value of 20 billion lire—or an export balance of 16 billion lire.

Although production of ammonium phosphate is not sizable in Italy, it was one of the first developments of the Italian fertilizer industry. The Italians long ago began using phosphoric acid instead of sulfuric acid for recovery of ammonia from coke and oven gas.

Progress has been made also in the manufacture of granular mixed fertilizers, of superphosphate and triple superphosphate.

Industry-sponsored research is carried on, not only at plant laboratories, but at various outside research laboratories.

Spearheading industry-sponsored research among chemical companies is Montecatini Corp. Currently this firm is spending in excess of five per cent of its gross sales on research, both basic and applied, and is supporting research programs at Italian universities and schools of engineering.

This five per cent rate is well above the rate in the American chemical industry, and also above the average in the Italian industry.

Montecatini's first research and testing station was opened at Novara in 1922 for the purpose of

studying problems connected with the production of nitrogen fertilizers. Today, at Novara, stands a center for research said to be one of the largest in Europe.

The research center has sprung from the laboratory where Giacomo Fauser obtained his first industrial results in the synthetic production of nitrogen compounds.

Only one of 10 Montecatini research centers, the Institute has been continually improved until it now occupies a total area of more than 430,500 square feet.

## **JAPAN**

### **First Post-war Exports Planned for Indonesia**

A contract for the export of 24,500 tons of ammonium sulphate to Indonesia was concluded recently by the Ammonium Sulphate Export Company of Japan.

It is the first time since the war that fertilizer will be exported to Indonesia from Japan.

## **KOREA**

### **Current Imports Sought Exceed Anticipated Needs**

In addition to a heavy seasonal domestic demand for chemical fertilizers, Korea has recently sought a substantial tonnage of a number of items.

The bids running in excess of the tonnage sought included 60,000 metric tons of ammonium sulfate; 19,000 metric tons of urea, 30,000 tons of ammonium nitrate; 10,000 tons of ammonium nitrate and ammonium sulfate, 250,000 tons of triple superphosphate, and 60,000 tons of normal superphosphate.

While a few of the bids submitted were for June, most of the tonnage offered was for July forward shipment. Countries submitting bids included the United States, Canada, Belgium, Italy and Japan.

## **MEXICO**

### **Import Taxes Repealed On Some Fertilizers**

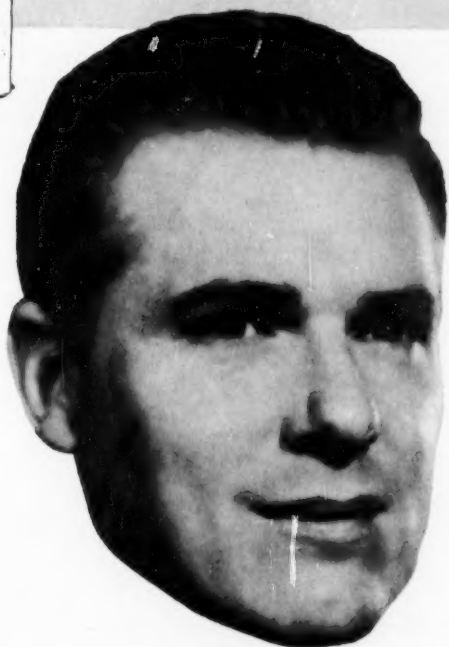
All import taxes on fertilizers not produced in Mexico have been repealed by Presidential decree.

Secretary of Treasury Antonio Carrillo Flores made the announcement, a turnabout from the former higher tariff policy which kept out imported products.

But the need for fertilizers in Mexico is growing, and local production cannot keep pace with demands. So, with the purpose of "not working a hardship on the nation's farmers" or to "damage national



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engineering enabled the company to reduce its range of Multiwall bag styles and sizes by 30 per cent!

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production," the free import of fertilizers is permitted.

The gimmick is that this holds true only for fertilizers not yet produced within Mexico. The administration has to walk a tightrope between the needs of farmers and the squawks of local fertilizer producers who howl every time regulations on imports are eased.

There is no time for reactions of local producers as yet. They will not like it. But the government stand is that the nation's farmers come first and that the measure will be strictly enforced, limiting imports to fertilizers not produced in Mexico. This cannot harm the national industry, according to the official view.

## PAKISTAN

### Imports Continue High, Subsidy Program Active

The Central Government will import 162,000 tons of fertilizers during the current financial year (1958-59).

The government also proposes to purchase within the country another 41,000 tons of indigenous fertilizers, which will be supplied to cultivators at subsidized rates as a part of government drive for increased agricultural production.

Over 83,000 tons of fertilizers are being distributed on cash and credit basis to paddy growers in Uttar Pradesh to enable them to step up their production.

## PARAGUAY

### Import Duty Lifted From Fertilizer Materials

The Paraguayan Government has put into execution Law No. 505, which exempts from payment of import duties natural and prepared fertilizers and raw materials for domestic manufacture of fertilizers, according to the U. S. Embassy at Asuncion.

Raw materials contemplated are not completely defined, but the following chemicals are mentioned specifically in the text of the law:

Commercial potash, caustic soda, sodium nitrate, sodium sulfate, and sodium carbonate.

These chemicals are exempt from duty only when imported for use as fertilizing materials or as processing ingredients in the manufacture of fertilizers.

It is understood that, in addition to the chemicals listed, exemption

would be allowed imports of all minerals and chemicals destined for use as fertilizers, including, most notably, phosphate rock.

## PERU

### Guano Production Rises, Synthetic Nitrogen Soon

Peru Guano is the principal fertilizer used in Peru. Guano is the principal fertilizer used in Peru. Production of this material increased from 261,000 metric tons in 1953 to 336,000 tons in 1956. Exports of guano have been restricted, although they amounted to 10,000 to 12,000 tons annually in 1955 and 1956. Some chemical fertilizers are imported.

A company began production of superphosphate during 1957 utilizing surplus sulfuric acid over its needs for rayon manufacture. Phosphate rock is imported from Florida. A petrochemical plant, which will produce ammonia, ammonium nitrate, and ammonium sulfate is under construction and manufacture of nitrogenous materials is expected to begin late in 1958.

## UNITED KINGDOM

### Subsidies Increased For Nitrogen Fertilizers

Under the United Kingdom Fertilisers Scheme, 1958, which has just been made with Parliamentary approval, the rates of subsidy for nitrogenous fertilisers (including nitrogen in compound fertilisers) are increased with effect from 1st July, according to Britain's Ministry of Agriculture, Fisheries and Food. The rates for phosphates are unchanged.

This implements the decision taken at the last Annual Review that some further encouragement to the use of nitrogenous fertilisers can be given.

## YUGOSLAVIA

### U.S.S.R. Credit Withdrawal Points to U.S. Aid Bid

Following its newest estrangement from the Soviet Union, Yugoslavia is looking eagerly to the United States. Without a large increase of American credits, the Yugoslav economy faces a dangerous exercise in brinkmanship.

Last month Moscow abruptly "postponed" — meaning canceled — \$285,000,000 credits for Yugoslavia, part of which was ear-marked to build a big artificial fertilizer plant near Belgrade.

By scrapping the project, the Rus-

sians have inflicted a heavy blow on Yugoslavia's agricultural development. The Yugoslavs import from Italy, Chile and elsewhere much of the 700,000 tons of fertilizers used every year.

Shortly before the outbreak of the new feud between Yugoslavia and the U.S.S.R., Tito applied to the U.S. Development Loan Fund, a branch of the foreign aid agency, for substantial help. Three projects were submitted, which included two large fertilizer plants in Bosnia and Croatia, mainly producing nitrate. Their capacity would be some 250,000 tons a year.

### W. Va. Laboratory Being Built in S. C.

A new multiwall packaging laboratory designed to develop technical improvements in paper shipping sacks is being established at Charleston, S. C., by West Virginia Pulp and Paper Company.

The laboratory will be operated as a unit of the new Multiwall Bag Division recently organized by the company.

"This new installation will be responsible for developing advances which will meet tomorrow's requirements in multiwall packaging, one of the nation's most important shipping mediums," David L. Luke 3rd, executive vice-president of the company, said. "In addition to the product development projects it will undertake, the laboratory will provide complete technical service for the company's multiwall customers."

Manager of the new laboratory will be Richard P. Kessler, formerly director of packaging research for Arkell and Smiths, whose multiwall operations recently were acquired by West Virginia.

Mr. Kessler is presently organizing a staff of skilled technical personnel to man the new installation and is arranging for the necessary equipment and instrumentation.

The laboratory will be equipped with completely automatic drop testing equipment, moisture-vapor barrier testing devices and an autographic stress-strain analyzer designed to measure the energy-absorption capacity, or toughness, of multiwall bag paper.

The new multiwall packaging laboratory will become the eighth unit in the company's network of research facilities. For its research program the company employs a technical staff of nearly 300 people and spends more than \$3,000,000 annually.



A new waterproof plastic sack, enabling farmers to unload bagged materials when and where they need them—even in the middle of a mud puddle—without fear of weather damage, has been put on the market. Now being used to package Spencer's ammonium nitrate, the 50-pound bag is made from polyethylene, the waterproof, weatherproof qualities of which make it useful in many ways after it has been emptied.

## Spencer Using Poly Bags

Polyethylene has a lot of uses, the newest of which is shown in the photograph of the farmer stacking bags of Spencer Chemical's "Mr. N" in the midst of a rainstorm. Spencer is now shipping 50 pound bags of ammonium nitrate in this trans-

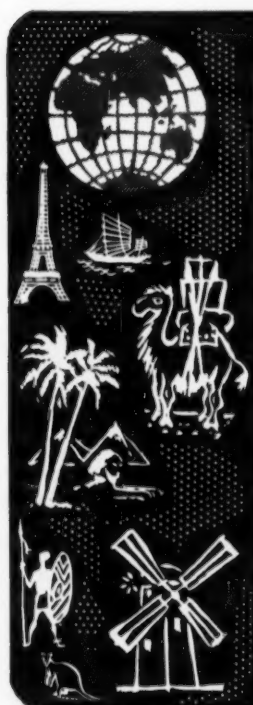
parent and highly re-usable container.

The Spencer people—who manufacture polyethylene as well as nitrogen fertilizer materials—forecast do-it-yourself adaptations of the material after it has been emptied and

washed. Essentially the bag is a tube, sealed at both ends. Opened out, 40 bags sealed together make a "tarpaulin" 14 by 18 feet which would cost about \$12 to buy. The sealing can be done by clamping the edges together, and heating with a blowtorch until they weld together. As the material is 10/1000 inch thick, it makes a strong and durable waterproof cover for farm machinery and the like. Similar sheets of polyethylene are now being used on farms for all sorts of weather-resistant purposes—and the bags themselves are excellent for storing things that need to be kept dry. The bag material is 5 times as thick as plastic bags in which vegetables and the like are being packed these days for retail grocery selling.

Spencer has devoted more than two years to making sure polyethylene is a good material for their purpose. Among other things they have tossed full bags from a truck going 30 miles an hour, onto a rough asphalt pavement. This and other rough handling tests showed the material could take it.

The Spencer people believe that the farmer will soon be buying not only fertilizer, but feed, seed corn and many other farm needs in "giant" plastic sacks.



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# MARKETS

**ORGANICS:** Natural Organic ammoniates for fertilizer use generally continue in quite tight supply position for the foreseeable future. All producers of leather nitrogenous tankage are completely sold out on their expected new season's production. Prices of leather nitrogenous tankage are nominally \$3.00 to \$4.00 per unit of ammonia, bulk, f.o.b. production point for July through August shipment, and 25¢ per unit higher for September/December, with another 25¢ increase January/forward.

**SEWAGE SLUDGE:** A major mid-west producer is reported fully committed for the new season at \$2.60 per unit of ammonia and 50¢ per unit of APA July through September. For October through December price is 50¢ per unit of ammonia higher, and for January through May another 15¢ additional. For June 1959, price drops 15¢ per unit of ammonia.

**CASTOR POMACE:** Domestic castor pomace in limited supply is priced at \$36.00 per ton in bags, f.o.b. Eastern Seaboard shipping point. Occasional offerings of imported material were last quoted at \$5.00 per unit of ammonia, bagged CIF Southeastern ports.

**DRIED BLOOD:** Chicago market is around \$8.00 to \$8.25 per unit of ammonia for unground sacked blood, with the New York market around \$6.50 to \$7.00.

**POTASH:** The domestic potash price situation, after a number of revisions of price announcements, boils down to 30¢ per unit K<sub>2</sub>O July and

## Industry Calendar

Date	Organization	Place	City
Aug. 14-15	N.E. Safety Schol	Cornell Univ.	Ithaca, N. Y.
Aug. 20-24	Canadian Fert. Assn.	Manoir Richelieu	Murray Bay
Oct. 13	Ag. Research Fert. Panel	Sciences Acad. Bldg.	Washington, D.C.
Oct. 16	NPFI Chem. Control	Shoreham Hotel	Washington, D.C.
Oct. 16-17	Fert. Control Officials	Shoreham Hotel	Washington, D.C.
Oct. 20-21	Fert. Safety Section	LaSalle Hotel	Chicago, Ill.
Oct. 22-24	Pacific N.W. Fert. Assn.		Gearhart, Ore.
Nov. 5-7	Fert. Round Table	Mayflower Hotel	Wash., D. C.
Oct. 29	S.E. Industry Advisory	Billmore Hotel	Atlanta, Ga.
Oct. 30	S.E. Fert. Conference	Billmore Hotel	Atlanta, Ga.
Nov. 9-11	Calif. Fert. Assn.	Ambassador Hotel	Los Angeles, Cal.
Nov. 16-18	Nat'l Fert. Solutions	Netherland Hilton	Cincinnati, Ohio
Dec. 3-5	Ag. Ammonia Inst.	Morrison Hotel	Chicago, Ill.

August, bulk, f.o.b. Carlsbad, New Mexico; for September-October 31¢; November-December 32¢; January through May 34½¢, and June 1959, 30¢. The above prices are for muriate on contracts made prior to July 1st. For contracts made after July 1st, prices are 2¢ per unit higher. Sulphate of potash f.o.b. Carlsbad is 59½¢ July-September; 64½¢ October-December; 67½¢ January-May; 64½¢ June 1959 per unit K<sub>2</sub>O bulk.

**GROUND COTTON BUR ASH:** Supplies of this 38 to 40% K<sub>2</sub>O potash, primarily in the form of carbonate of potash, are heavily sold, particularly for the balance of 1958, but supplies are available January through June 1959. Price continues unchanged and delivered cost compared favorably with domestic sulphate of potash for most destinations.

**SUPERPHOSPHATE:** Production continues at seasonal levels and

prices continue steady at levels closely approximating those of the season just ending.

**AMMONIUM NITRATE LIMESTONE:** Prices continue at previous levels, as no news of change in prices has been reported. Movement is entirely in seasonal volume.

**SULPHATE OF AMMONIA:** Producers of sulphate of ammonia are in heavily contracted position for the new season at prices ranging from \$32.00 bulk coke oven type to \$35.00 for granular type, f.o.b. origin points.

**GENERAL:** It appears that certain forms of nitrogen will be priced at lower levels than during the past season, as will also be the case with domestic potash. Fertilizer manufacturers seem pleased with the elimination of transportation tax which affects every material they receive and ship out.

## CF-Staff Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	June		May		Jan.-Mar. Qtr.		July-December		January-June		YEAR (July-June)	
	1958	1957	1958	1957	1958	1957	1957	1956	1957	1956	1956-57	1955-56
Alabama		62,720 <sup>1</sup>	158,660	162,101	246,637	291,116	172,721	174,623	808,900	872,550	983,607	1,042,416
Arkansas	30,048	26,835	31,301	52,965	75,919	120,907	62,752	59,915	265,265	299,172	325,150	359,471
Georgia	233,786	136,249	302,211	301,056	145,308	221,375	269,529	253,559	980,824	988,454	1,234,383	1,244,422
Kentucky		29,839 <sup>1</sup>	150,713	142,280	139,541	173,850	88,771	90,234	451,083	441,481	541,367	529,600
Louisiana		25,940 <sup>1</sup>	39,321	42,699	105,459	81,709	64,192	71,129	200,277	217,343	271,406	273,688
Missouri		50,368 <sup>1</sup>	151,067	129,714	79,445	219,689	335,312	331,343	460,487	444,230	791,830	800,471
N. Carolina		66,203 <sup>1</sup>	295,452	211,294	438,009	534,774	199,445	216,234	1,300,353	1,324,267	1,516,587	1,649,449
Oklahoma	6,055	5,860	13,983	8,484	20,160	27,868	51,436	54,503	52,836	65,854	107,345	135,396
S. Carolina	53,663	29,475	102,787	72,526	286,778	393,741	116,874	122,929	694,571	743,670	817,500	853,617
Tennessee	44,938	110,689	112,462	137,378	84,114	48,649	135,717	141,181	383,457	378,626	549,253	532,886
Texas	98,263	54,128	90,118	60,589	163,525	205,547	213,801	202,406	392,770	372,695	595,176	566,399
California		(reports compiled quarterly)			253,545	264,270		412,747 <sup>1</sup>	663,484	639,377	1,079,748	1,001,554
Virginia		(reports compiled quarterly)			218,551	277,124	140,784	154,075	600,158	599,111	754,223	761,820
Indiana		(reports compiled semi-annually)					284,959	305,917	781,268	807,981	1,087,185	1,063,049
Iowa		(reports compiled semi-annually)						85,147 <sup>1</sup>		315,329 <sup>1</sup>		445,329 <sup>1</sup>
Michigan		(reports compiled semi-annually)						184,763 <sup>1</sup>		443,908 <sup>1</sup>		"
New Hampshire		(reports compiled semi-annually)					3,956	3,253	15,730	13,168	18,983 <sup>1</sup>	"
Washington		(reports compiled semi-annually)						55,709 <sup>1</sup>				76,660 <sup>1</sup>
Oregon		(report issued annually)					45,063	62,147	138,926	120,871	201,073 <sup>1</sup>	"
TOTAL	466,753	363,236	1,448,075	1,321,086	2,257,991	2,860,619	2,185,323	2,243,504	8,190,389	8,328,850	10,654,760	10,824,238

(not yet reported)

\* Not compiled

<sup>1</sup> Omitted from column total to allow comparison with some period of current year.





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A get-together in Monsanto's suite for breakfast at the Greenbrier during the annual NPFI convention in June. These pictures reached us too late to appear in CF's July convention report issue. Shown are:

1. Mrs. C. G. Thompson; Mrs. D. H. Banks, Sr.; Mrs. Jack Rutland; Mrs. F. L. Wooten; Mrs. W. M. Campbell; Mrs. George Barley; Mrs. D. H. Banks, Jr.; Mrs. Quentin Lee.  
2. Mrs. James E. Nall; Mrs. B. F. Sutherland; Mrs. J. E. Nunnally; Mrs. Gene Van Deren; Mrs. John Perryman.  
3. Mrs. George Walton; Mrs. Edwin Pate; Mrs. Tom Wright; Mrs. Laney Black; Mrs. John Christian; Mrs. T. K. Smith; Mrs. Jim Crawford; Mrs. Charles Workman; Mrs. Paul Truitt; Mrs. Frank Lavery.  
4. Mrs. W. D. Barton; Mrs. Stanley Hackett; Mrs. E. D. Kingsbury; Mrs. Sam Nevins; Mrs. Frank Lavery; Mrs. Bill Tyler; Mrs. Russell Coleman; Mrs. H. V. Miller; Mrs. John Miller; Mrs. P. J. Gum.  
5. Monsanto ladies; Mrs. Bernard Machen; Mrs. Sam Clements; Mrs. Jim Crawford; Mrs. Dick Goldthwaite; Mrs. John Christian; Mrs. T. K. Smith.



A group of Montana association members gather to discuss plans for action: Pat Devolr, Occident Elevators; Homer Turner, Anaconda Co.; John D. Ross Jr., Graham and Ross; Lyle Ekstrom, Anaconda Co.; Phil Davis, Balfour Guthrie & Co.; Art Wolcott, Farmers Union Central Exchange; Warren Stenslund, Cominco; Dean Travis Jr., J. R. Simplot & Co.; Ray McGregory, Phillips Chemical Co.; George Mason, Montana Flour Mills; Harold Martin, Van Waters and Rogers; Dwight Ditzun, Harrisons and Crosfield.

## Montana Association Holds Summer Session

Members of the Montana Plant Food Association recently gathered at Chico Hot Springs Lodge, Montana, for their first annual summer meeting.

The association was formed about a year ago to promote the proper use of fertilizer in the state. One of its functions is to work closely with the college and federal authorities in helping to disseminate fertilizer recommendations to the dealers and consumers.

President Dean Travis acted as chairman for the two day session. Other officers include George Mason, vice president, and Ray McGregory, secretary-treasurer.

The recent survey of the National Plant Food Institute on the Farmers Attitude Toward the Use of Fertilizer was discussed in detail by the group, after a slide talk by F. Todd Tremblay, Northwest representative of NPFI on how this survey could be used to increase proper use of fertilizer in Montana. A number of working committees were set up by President Travis to work with the College on developing factual fertilizer information for practical use by the dealers and consumers. Members were urged by Mr. Travis to support the experiment station field days being held throughout the state.

Jesse Green gave a talk on the subject "The High Energy Bonds of Phosphorus." He discussed the importance of phosphorus in animal feeding in Montana, stating that

"there is much evidence to show that the quality of hay and pasture depends as much upon its phosphate content as upon the percent of protein."

## Two October Fertilizer Meetings

The month of October will find fertilizer people attending two important conferences: October 13, Agricultural Research Institute Panel on Problems Related to Agriculture in the Fertilizer Producing Industry. Academy of Sciences Building, Washington, D. C.

October 16, National Plant Food Institute Conference on Chemical Control Problems. Shoreham Hotel, Washington, D. C.

## NAC 25th Anniversary Meeting

The National Agricultural Chemicals Association has just released the preliminary program for its three-day, silver anniversary meeting to be held at the Bon Air Hotel in Augusta, Georgia, October 29, 30 and 31, 1958.

The program includes panel discussions on the subjects of public relations and the expansion of future markets, also talks by NAC president, Jackson V. Vernon, vice-president of Food Machinery and Chemical Corporation; John Gillis, vice-president of Monsanto Chemical Company; and Frank Washburn, general manager of the agricultural division of American Cyanamid Company.



## IM&C's Thomas Heads NPFI Midwest Committee

R. P. Thomas, International Minerals & Chemical Corp., was elected chairman of the National Plant Food Institute's Midwest Research and Education Committee at a meeting at the Builders' Club in Chicago last Friday. Zenas H. Beers, NPFI Midwest regional director, was named secretary of the group.

Thomas was also selected as the committee's representative on the National Steering Committee. Leo Orth, Sinclair Chemicals, Inc., was named alternate.

Attending the meeting were: Messrs. Allstetter and Beers; W. T. Dible, International Minerals & Chemical Corp.; Dale Friday, Nitrogen Division, Allied Chemical Corp.; Proctor Gull, Spencer Chemical Co.; Hartl Lucks, Smith Agricultural Chemical Co.; Werner Nelson, American Potash Institute; Leo Orth; Leonard Schrader, Standard Oil Co.; C. L. W. Swanson, The Texas Co.; R. P. Thomas; and H. H. Tucker, Sohio Chemical Co.

## Over 550 Attend Ga. P.F.E.S. Sessions

A total attendance of 556 marked summer fertilizer conferences and grazing system contest awards sponsored by Georgia Plant Food Educational Society in cooperation with the state college and extension service.

Program formats were identical for the four regional meetings, each held on the farm of the grazing contest winner for that district. The Northwest meeting was July 1, at Zebulon; the Southwest at Albany July 2; Northeast, at Commerce July 9; and Southeast at Statesboro July 10.

Assembly and registration were followed by a briefing on the pasture layout, with mimeographed data on treatment of the plots, and distribution of the new fertilizer recommendations for Georgia.

After a forenoon tour, awards were presented at a business-meeting luncheon, and an afternoon visit to nearby farm sites concluded each program.

Top three among the state winners received a trip—for the farmer and his county agent—to International Livestock Show, International Dairy Show, or National Dairy Congress.

First prize went to Ernest Nunn, Jackson county dairy farmer, who has 69 of his 185 acres in permanent pasture and 55 acres in cropland. Some of the land is double-cropped each year. Liming as need-

ed every 3-5 years, his typical fertilizer application is 500 lb./acre of 4-12-12 with additional nitrogen applications ranging from 33 to 93 lb./acre, depending on the crop.

## Ga. P.F.E.S Cooperates On Soil Program

Last fall the Georgia AES launched an Intensified Soil Fertility Program on a test basis in six Southcentral Georgia counties. This test program, which was directed by county agents, was highly successful and will be continued this year on a bigger scale than last year. Present plans are to launch a "Soil Fer-

tility Program" in 22 additional counties this fall. Also, fertility work will be continued in the six Southcentral Georgia counties. In addition, some fertility work will be conducted in all Georgia counties. Members of the Georgia Plant Food Educational Society are cooperating in the promotion of this program.

Georgia Plant Food Educational Society has just published Fertilizer Recommendations for Georgia. Copies may be ordered from Mr. James Southerland, Extension Editor-Publications, Agricultural Extension Service, Athens, Georgia, at a small cost.

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## Round Table Date Changed

Owing to numerous conflicts with other meetings the forthcoming Fertilizer Industry Round Table will hold its meetings at the Mayflower

Hotel in Washington, D. C. on November 5, 6 and 7, 1958.

Persons planning to attend the Round Table are kindly advised to make their hotel reservations promptly and avoid disappointment.



Pictures from recent Sixth Annual California Fertilizer Conference at California State Polytechnic Conference.

**Top**—Head table at banquet (left to right): M. E. McCollam, chairman, Soil Improvement Committee of CFA, and Western manager, American Potash Institute, San Jose; Dr. A. M. Boyce, principal banquet speaker, who is director, Citrus Experiment Station, Riverside; W. G. Hewitt, president of CFA, and president, Pacific Guano Co., Berkeley; Earl R. Mog, conference chairman, and owner, Growers Fertilizer Co., Berkeley; Dr. R. B. Bahme, Western Representative, National Plant Food Institute, San Francisco.

**Center**—Range Fertilization Panel (left to right): Russell Helphenstine, farm advisor, San Luis Obispo County; M. S.

Beckley, farm advisor, Santa Clara County; Lyman Bennion, head, Animal Husbandry Dept., Cal-poly; Dr. R. Merton Love, University of California, Davis; Lester J. Berry, agriculturist, University of California, Davis; George Park, Rocca-Cuvi, Inc., San Francisco; Dr. Logan Carter, head, Soils Dept., Cal-poly, San Luis Obispo; Curtis Berryman, panel moderator and Agricultural Extension Service director, San Luis Obispo County.

**Bottom**—Panel on Crop Response to Sulfur (left to right): Dr. W. E. Martin, Extension Soils specialist, Univ. of Calif., Berkeley; Dr. Albert Ulrich, plant physiologist, Univ. of Calif., Berkeley; Dr. Clarence M. Johnson, University of California, Berkeley; Dr. Victor V. Rendig, University of California, Davis; **Standing**—Robert L. Luckhardt, Panel Moderator, Collier Carbon & Chemical Corp., Brea.

## Control Officials Meet October 17

The Association of American Fertilizer Control Officials will hold its twelfth annual meeting in Washington, D. C., at the Shoreham Hotel, Friday, October 17, 1958. The States Relations Committee will meet at the same hotel, Thursday evening, October 16 at 8 P. M. Members of the fertilizer industry, fertilizer control officials, and interested agricultural workers and others are cordially invited to attend both meetings.

In addition to reports by various investigators and committee chairmen, the following program will be carried out:

**Presidential Address**—J. J. Taylor, Tallahassee, Florida.

**Current Agricultural Trends**—Dr. Oris V. Wells, administrator, Agricultural Marketing Service, USDA, Washington.

**Agronomic Evaluation and Use of Fertilizer Consumption Statistics**—Dr. Woody N. Miley, Extension soils specialist, University of Arkansas, Little Rock.

**Progress Report on the National Plant Food Institute Chemical Control Research Project**—Dr. Vincent Sauchelli, chemical technologist, National Plant Food Institute, Washington.

**Some Observations on Labeling Specialty Fertilizers**—E. A. Epps, Jr., chief chemist, La. Department of Agriculture, Baton Rouge.

**Materials Used in the Manufacture of Mixed Fertilizer**—Dr. J. Richard Adams and Walter Scholl, USDA, Beltsville.

Registration procedure will be greatly facilitated if those planning to attend would notify the secretary-treasurer, B. D. Cloaninger, Box 392, Clemson, S. C., so that a card and name plate may be made prior to the meeting. There is no registration fee.

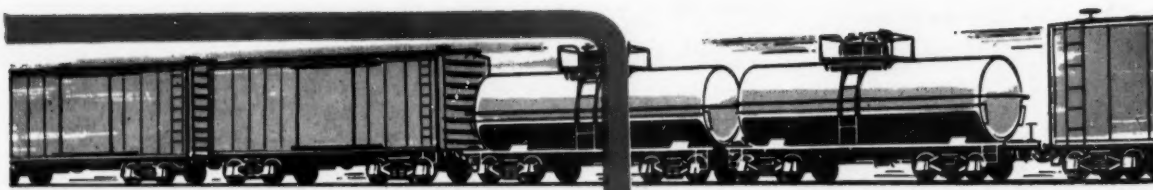
## Alaska Offered Soil Testing

The University of Alaska AES has compiled a leaflet on soil testing, which notes that the AES has a modern soil testing laboratory at Palmer to serve the public.

## Hog-Corn No Longer Yardstick

It seems that the old reliable measure of hog output and prices, the hog-corn ratio, is on its way out because hog crop movements are no longer so closely related to the movements of corn.





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WICHITA, KAN.—501 KFH Building

## Del-Mar-Va Convention Drew 325 To Ocean City

Attendance of approximately 325 marked the 37th annual convention of the Del-Mar-Va Peninsula Fertilizer Association at Ocean City, Maryland June 28.

The business session, held in the Roof Garden Room of the George Washington Hotel, was opened with a talk by association President James R. Ford of Warner W. Price Co., Smyrna, Del. Following his message, Mr. Ford introduced to the convention the agronomists and state control officials who were in the audience.

Dr. Willard H. Garman appeared on the program, representing National Plant Food Institute, and Dr. E. T. York, Northeastern manager of American Potash Institute, made a talk on "Plant Food Relationships," illustrated with film slides.

Following a luncheon, the group engaged in planned entertainment activities during the afternoon. Ladies activities were under direction of John L. Morris, Mrs. T. Scott Purse and Mrs. William B. Tilghman Jr., while the men's program was supervised by Elbert N. Carvel, Dallas D. Culver and Robert A. Fischer.

The meeting concluded with a Coke and cocktail party in the early evening, followed by dancing in the Roof Garden Room.

## Analyst Sees Need For More Ammonia Capacity

Consumption of ammonia and its derivatives is catching up with production capacity, it was reported last month by R. P. Westerhoff, vice president of Ford, Bacon & Davis, Inc., management and engineering consulting concern. He said sharp increases in productive capacity were necessary.

Mr. Westerhoff said that the synthetic ammonia industry would have to increase its capacity by about 80 per cent to meet farm and industrial demands by 1975. At today's costs, he said, this would require capital investments of \$450,000,000.

Existing ammonia output, valued at \$500,000,000 is about 10,000,000 pounds a year.

"Soil enrichment needs alone could pre-empt existing ammonia capacity in a few years," he said. "In addition to 8,000,000,000 pounds of new capacity for predictable agricultural and industrial uses, some \$50,000,000 worth of extra capacity

## Of This and That . . .

If you didn't see it, you may want to read in July READERS DIGEST the story "Fish-Pond Fever" which tells how Charles Ellis, Jr. of Mutual Fertilizer Company, Savannah, Ga., opened up a new market for plant food over the past two years. Devising a highly concentrated plant food which he called Hydro-Pak, packed in easy to handle forty-pound bags, he sold close to five million pounds for fish ponds from Washington, D. C. to Texas.

We got a good laugh from a letter from W. D. Wright, Jr., package engineering specialist for St. Regis Paper Co., whose office is in New York City and home in Webster, N. Y. W.D.W., a CF subscriber, has his copy sent to his home each month, and recently wrote us for a copy of our Year Book. Since we publish this edition for the fertilizer industry, we try to determine each reader's association with the industry before releasing a copy to him. Replying to our standard query on this, he supplied the information and wound up his letter with the following: "Presume you are wondering what a fellow with the above address (home) wants with a Fertilizer Directory. This just happens to be my home and darned if I will move to New York City."

will have to be built concurrently to meet demands for ammonium nitrate as an explosive." Exports of nitrogen fertilizer also will contribute to the industry's growth, he said.

## Canadian Meeting Plans Set For August 20-24

Convention Chairman Alex Mooney is predicting favorable weather and "a good time for all" at the 13th annual convention of Canadian Fertilizer Association (formerly Plant Food Producers of Eastern Canada), to be held at Manoir Richelieu, Murray Bay, Quebec. A sizeable group is planning to reach Murray Bay from Montreal by boat trip.

Mr. Mooney reports that "Everything possible is being done to make this year's Convention of real interest to our guests."

A new tank car painting program that combines aesthetics and utility has been established by U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation. The entire U.S.I. fleet of 900 tank cars will be repainted during the next few years according to Carl A. Greeley, National's vice president in charge of traffic. Inherent in the new design is a color coding system that immediately identifies the type of service for which tank cars are used. Among the identifying colors on domes of the tank cars are: ammonia—bright yellow; sulphuric acid—black; phosphatic fertilizer solution—bright orange; and nitrogen fertilizer solution—bright red.



## Southwest Conference Hears NPFI's Area Plans

More than 275 industry representatives, control officials, college and USDA personnel turned out for the 33rd annual Southwestern Fertilizer Conference and Grade Hearing at Galveston, Texas July 18-19.

Dr. Russell Coleman, executive vice president of National Plant Food Institute, gave some preliminary remarks about NPFI's recent study on Farmers Attitudes Toward the Use of Fertilizer, and introduced Dr. Robert L. Beacher, the Institute's Southwestern regional director, who outlined the recommended program for boosting plant food usage in that area.

Major projects, he explained, include a county promotion, an undertaking with bankers, and a demonstration visitation program. The county promotional program, slated to get under way this fall—initially in one Louisiana parish, one East Texas county and two counties in Arkansas—aims at testing the soil on each farm in the county within a 12-month period.

The demonstration visitation scheme will focus on attracting more farmers and fertilizer salesmen to demonstration plots being conducted by colleges in the Southwest.

Another facet of the Institute's program in the Southwest, Dr. Beacher told the group, is to revise its research projects in that area to develop better information on economic returns from fertilization under varying moisture conditions.

## Product Standardization

(Continued from page 18)

pletely uniform mixture would probably not affect yields. It is reasonable to assume, however, that radical departures from a uniform mix would in general reduce the yield compared with the yield from applying the same total quantity of nutrients in a uniform mixture. Only in instances where nutrients substitute at constant rates could we expect radical departures from uniformity to fail to affect yield.

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## Leroy Donald Heads NPFI Southwest Committee

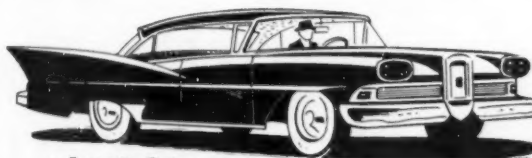
Leroy Donald, Monsanto Chemical Co., was named chairman of the National Plant Food Institute's Southwest Research and Education Committee at a meeting in Galveston, Texas, July 17. The committee selected Dr. Robert L. Beacher, NPFI Southwest Regional director, as secretary.

Most of the discussion centered around NPFI's proposed county promotion program which is slated to get under way this Fall in Louisi-

ana, Arkansas and East Texas.

Committee members in attendance included A. B. Beasley, Spencer Chemical Co.; I. A. Irwin, Virginia-Carolina Chemical Corp.; Dr. N. D. Morgan, American Potash Institute; Floyd W. Prather, Central Texas Fertilizer Co., Inc.; R. W. Scanlan, Phillips Petroleum Co.; and G. A. Wakefield, Olin Mathieson Chemical Corp., who substituted for Dr. U. S. Jones.

The third meeting of the committee is scheduled for early December during the Arkansas Fertilizer Conference at Fayetteville.



**NO MATTER  
WHAT SIZE  
OPERATION  
YOU HAVE ...**

**THERE'S A BLUE VALLEY  
GRANULATION UNIT ENGINEERED  
FOR YOUR PLANT!**

Blue Valley units incorporate economy and operating flexibility along with the capacity and quality production you desire. So, when considering granulation, think first of Blue Valley . . . the company with more units operating than any other. Write, wire, or call . . .



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AND ENGINEERING CO.**

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TOPEKA, KANSAS  
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# HOW WELL DOES TREBO-PHOS\* GRANULATE?

**Cyanamid's Triple Superphosphate in typical commercial run  
produces granular 5-20-20 of outstanding quality.**

- 1. EQUIPMENT**—TVA Continuous Feed Ammoniator; Co-current Dryer;  
Con-current Cooler

**2. FORMULA**

**MATERIALS**

	<u>LBS</u>
TREBO-PHOS Triple Superphosphate — (APA 48.28%; Ins. 1.04%; H <sub>3</sub> PO <sub>4</sub> 3.09%; Moisture 7.25%.) .....	628
Normal Superphosphate .....	493
Nitrogen Solution: (25% NH <sub>3</sub> ; 69% NH <sub>4</sub> NO <sub>3</sub> ) .....	62
Anhydrous ammonia .....	88
H <sub>2</sub> SO <sub>4</sub> , 66° Be .....	130
Potash .....	645

**3. RESULTS**

Production rate: 20 tons per hour

Through-put production: 82%

GRANULATION: EXCELLENT

WRITE, WIRE OR PHONE FOR FULL INFORMATION. OUR REPRESENTATIVE  
WILL BE GLAD TO CALL. NO OBLIGATION ON YOUR PART

\*TRADE MARK



American Cyanamid Company, Agricultural Division, Phosphates Department  
30 Rockefeller Plaza, New York 20, N. Y.



# Equipment News Roundup . . .

## Bagging, Shipping Booklet

K. E. Savage Company has announced a new two-color eight-page booklet titled "Bagging and Shipping Equipment" for the fertilizer industry.

The illustrated pamphlet describes their low cost, compact, simple shipping mill for bagging large volume of fertilizer, and gives full specifications on the equipment. Another section outlines the rugged Savage sewing machine stand, while subsequent sections cover their line of horizontal and inclined belt conveyors, truck loading conveyors, industrial design and related services.

Copies may be obtained without cost by writing to K. E. Savage Company, 823 West 21st St., Norfolk 10, Va.

## New Feeding Systems Bulletin

Simplex or duplex gravimetric feeders for liquids or solids are the subject of a new eight-page, three-color bulletin issued by Omega Machine Co. division of B-I-F Industries. The bulletin provides explanatory text, dimensional drawings and tables, photographs, schematic drawings and performance charts.

Continuous Loss-In-Weight feeding systems maintain accuracy with  $\frac{1}{2}\%$  of set feed rate over the entire range, which may be 10:1, 20:1 or up to 50:1. Capacities are available from 1 pound to 60,000 pounds per hour. Simplex and duplex systems are adaptable to either local or remote control, and can be used for proportional pacing by mechanical, electrical, or pneumatic means. Loss-In-Weight is stated to be the only gravimetric system having complete closed loop control with feedback and memory which prevents cumulative error. Systems are factory-calibrated and sealed as true scales, requiring no sampling or calibration when installed.

For your copy of Bulletin #32-R2, write to Omega Machine Co., 345 Harris Ave., Providence 1, R. I.

## Electrostatic Separator

Dings Magnetic Separator Company has recently secured rights for world-wide manufacture and sale of the "Coronatron"®, an electrostatic separator designed and developed by Quaker Oats Company.

Electrostatic separators subject dry, granular materials to high-voltage, low-amperage current; as various materials react differently in relation to their susceptibility to the charge, it is possible to recover valuable materials from low-value mixtures. As a supplement to the Dings line of dry high-intensity magnetic units, the Coronatron electrostatic separators will permit wider applications in purification and concentration of chemicals, phosphate, and numerous other non-metallic minerals.

Further details are available from Dings Magnetic Separator Co., 4711 W. Electric Ave., Milwaukee 46, Wisc.

## Spreader Chain Discharge

Baughman Manufacturing Company's K-5 Lime and Fertilizer Spreader Body now features a lubrication-impregnated drag chain discharge designed to resist corrosion and virtually eliminate "freezing" of the body's automatic discharge system.

Baughman employs a special process to saturate the heavy 40,000 lb. (total strength) test malleable block chain discharge with a permanent lubricating agent. Baughman says introduction of the new K-5 feature is a result of continuous research and development aimed at improving the operation of automatic self unloading truck bodies.

Baughman produces a complete line of lime and fertilizer spreaders, and bulk transport bodies. Additional information about any of these may be obtained by writing Baughman Manufacturing Co., Jerseyville, Ill.

## Reinforced Fiberglass Ladder

A brochure describing a new line of reinforced fiberglass ladders has been made available by Putnam Rolling Ladder Company, which claims this to be the toughest and most durable ladder ever constructed. As an added safety feature, non-slip rungs are covered with grit-embedded neoprene.

For a free brochure, write Putnam Rolling Ladder Co., 32 Howard St., New York 13, N. Y.

## Case Tractor Literature

Trenching, loading, and dozing machines—complete ready-for-work units mounted on Case 34 and 42 h.p. Utility tractors—are concisely described and illustrated in 8 new publications now available from J. I. Case Co. A 6-page leaflet shows the company's line of wheel and crawler tractors, companion Case-built backhoes, front-end loaders and dozer blades, plus a large selection of specialized attachments. In addition, 6 new 2-page specification sheets spotlight major operating features and mechanical details of individual tractor-equipment combinations. A seventh 2-pager describes a 5-ton tilt-trailer the Case Co. offers at substantial savings over regular commercial models with purchase of a new Case machine. All literature free upon request to J. I. Case Co., Racine, Wisc.

## Tape-Over-Seam Multiwall Closure

Union Special Machine Company has announced development of a simple, economical new method of closing tops of multiwall paper bags with a "tape-over-seam" closure. This closure is produced by machine, Style 80600 HZ, which has been specially designed for automatically applying pressure sensitive, self-adhering tape in conjunction with the sewed closure.

The machine is similar to the standard Union Special Style 80600 H with the exception of the folder and sewing parts combination. Tape is fed to the folder from a reel and tape guide assembly, then through a slot in the presser foot just behind the needle. It is sealed over the line of stitching by the pressure of the presser foot. An automatic trimming device clips off the tape at each end of the closure.

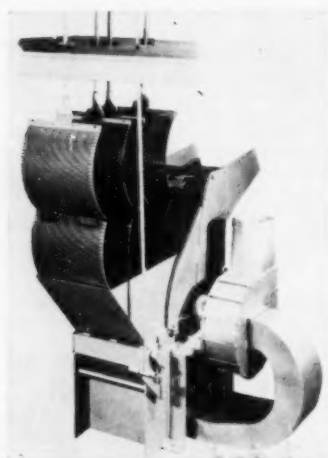
This new method offers significant improvement and economy over older methods that require heating units and glue. It also contributes other advantages. The closure is virtually airtight and moistureproof, eliminating the possibility of sifting resulting from needle perforations. Such a closure is particularly applicable where expensive chemicals and fine powdered mixtures are bagged and, for other products, where loss of content, or contact with air or moisture is a problem. With this closure, there is no need to use a filter cord in the sewing.

Style 80600 HZ is fitted to accommodate a  $2\frac{1}{2}$ " tape width that finishes approximately 1 inch wide when folded over. Machines can also be ordered for use with narrower tape to a minimum of  $1\frac{1}{2}$ " width to finish  $\frac{3}{4}$  inch. This sewing head can be mounted on all existing frames that are normally used with Style 80600 H heads.

Detailed information about the Tape-Over-Seam closure may be obtained by addressing inquiries to Union Special Machine Company, Dept. B 10, 400 N. Franklin St., Chicago 10, Ill.



Top: Union Special Bag Closing Machine equipped with Style 80600 HZ sewing head for producing Tape-Over-Seam closure. Bottom: A view showing how self-adhering tape is folded over sewed top of bag.



## New Schutte Device

A new Schutte device permits hammer mill screens to be replaced instantly from the floor above. The attachment features extension handles which permit any one of 5 selected screens up to  $\frac{1}{4}$ " thick to be inserted or removed while the mill is running. With easy operation made possible by the positive action of an eccentric lock, the device is available for all standard Series 10 Schutte Hammer Mills, can be adapted to any ceiling height and requires no special gadgets or mechanisms. Design prevents leakage around the mill.

New Bulletin HW 458 with complete details and specifications will be mailed on request by writing to Schutte Pulverizer Co., Inc., 878 Bailey Ave., Buffalo 6, N. Y.

## Protective Coating

Cold-set tank lining materials have now been developed specifically for the fertilizer industry by Wisconsin Protective Coating Company for service in nitrogen solutions, phosphoric acid, ammonium nitrate and other materials. They are also used to protect hot process piping and steel from nitric acid fumes, and spillage and other areas where corrosion problems are severe.

Write them for Condensed Technical Bulletin 258; the address is P. O. Box 243, Green Bay, Wis.

## New Laboratory Agitator

A newly designed rotary liquid agitation laboratory apparatus for use in the milling, feed and fertilizer industries is now being produced by New Brunswick Scientific Company.

Operating electrically, this unit—Model ST Spinnerette—eliminates need for manual shaking of test tubes or small vessels. It combines the versatility of four rotating speeds with the advantage of a changing tilt angle of platform to provide optimum variation in rate of mixing or agitation.

For further details write New Brunswick Scientific Co., P. O. Box 606, New Brunswick, N. J.

## Dorr-Oliver Plastic Filter

Dorr-Oliver has announced availability of a rotary drum vacuum filter constructed of Fiberglas. First plastic filter to be offered commercially, this unit has been developed specifically for mildly corrosive applications which normally require special materials of construction. Cost of a plastic filter is stated to be less than that of rubber covered or stainless steel machines of comparable size and design.

The manufacturer claims this new plastic filter is particularly applicable to operations in which scaling is a major consideration. As a result, maintenance costs should be lower than for conventional units. Because the unit is lighter in weight than other materials of construction, considerable economies are possible in the structural members and rigging is easier.

Further information may be obtained from Dorr-Oliver Inc., Havemeyer Lane, Stamford, Conn.

## New C-Mar Flow Meter

A new area-type flow meter, embodying a unique design principle, is now available from The C-Mar Corporation. This general purpose industrial flow meter is claimed to accurately measure flow rates with new standards of float stability, and features a quick-out flow tube for easy maintenance and range change.

Known as the C-Mar Series 5000 meter, this variable area flow meter is designed for outstanding stability, which results from the Tapor-Flo principle. The float lines out quickly without bobbing, to permit exact reading of flow value without visual averaging.

Additional information on the C-Mar Series 5000 Tapor-Flo meter is available from C-Mar Corporation, 35 Euclid Avenue, Manasquan, N. J.

## Geared Counter-Weight Feeder

For controlled feeding of a wide range of bulk materials at high rates, Link-Belt Company has just announced its new Straightline Geared Counterweight Vibrating Feeder.

Capable of absorbing great impacts, the new unit can be mounted directly under a hopper or bin to feed, convey, pick or scalp high tonnage of materials. A geared eccentric shaft mechanism produces a high intensity straight-line stroke that ranges in amplitude from  $\frac{1}{4}$  to  $\frac{1}{2}$  in. up to 900 RPM.

Where the rate of feeding bulk materials has to be controlled and the headroom is limited, this new vibrating feeder provides an ideal solution, and lends itself to a variety of adjustments. Available in a wide range of dimensions to suit many types of installation purposes, the new feeder can be floor supported or suspended by cables from bins, tanks or hoppers.

Complete information on the new Straightline Geared Counterweight Vibrating Feeder is contained in leaflet 2670. For your copy contact your Link-Belt district sales office, or write to Link-Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill.

## New Value Bag Packer

A recent addition to Coddington's line of 'Auger-Matic' valve bag packers employs an improved fluidizing air principle of conveying powdery and free flowing materials. The new 'Air-Pac' Valve Bag Packer fills standard valve bags of from 20 lbs. to 100 lbs. No moving parts are used and no motor is required so that filling operations are accomplished without noise or vibration. The packer is ready to operate when connected with 110 volt AC service and to standard low capacity air compressor system.

An accurate built-in scale provides close weight control and shuts off the packer automatically when desired weight is reached. Air-Pac is claimed to reduce bag costs through the use of a small diameter spout on the machine that fits into small valve opening in bags of minimum size.

Full information can be obtained by writing the E. D. Coddington Mfg. Co., 5050 North 37th St., Milwaukee 9, Wis.

## Dust Collector Brochure

A revised edition of a 12-page bulletin describing and illustrating a wet type dust collector that separates the dust from the air by centrifugal and impingement action against wetted surfaces, without the use of sprays, moving elements, and water eliminators is now available.

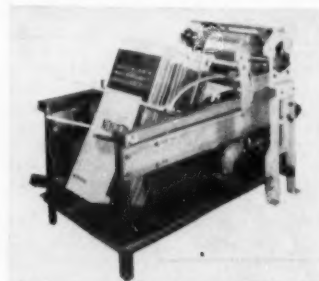
Bulletin No. 581 may be obtained by writing to Dust Suppression & Engineering Co., P. O. Box 67, Lake Orin, Mich.

## Automatic Bag Printer

A new, automatic machine for in-plant imprinting of multiwall bags has been announced by Industrial Marking Equipment Company. Claimed to eliminate pre-printing, bag obsolescence and to simplify inventory, the unit feeds and prints up to 20 multiwall bags per minute. The feeding mechanism is vacuum pump operated and the magazine holds 250-300 bags at one time. The printer is intended for use with production line filling equipment.

Design is said to overcome variables, and the unit is manufactured so that it can be operated intermittently as well as automatically and continuously holding register very accurately.

The new unit can be produced to fit a single bag size, or made adjustable for moderate variation in bag sizes. Complete details are available on request to Industrial Marking Equipment Co., 655 Berrian St., Brooklyn 8, N. Y.



### New Automatic Checkweigher

A new higher capacity automatic checkweigher, designed to govern uniformity and control costs by maintaining a constant check of items passing over the unit, has been announced by Toledo Scale, Division of Toledo Scale Corporation.

Identified as a Model 9460, it is capable of handling packages or bags weighing between 25 lb. and 200 lb., with an accuracy of .1%. Equipped with a belt-type motorized conveyor weigh section, items pass over the unit at a rate of approximately 20 per minute and are checked "on the run" against a predetermined weight.

An over-under zero indicator, with both front and back indication, provides a visual check of the weight of the items. The Model 9460 can be furnished with an electrical mechanism built into the indicating head to operate a pilot light unit, either mounted on the scale or at some remote location. The pilot light unit consists of five color-coded lights to show which of the weight zones (OK; OK-heavy; OK-light; over; under) into which the item falls. A magnetic counter unit is also available to maintain an accurate production record of items falling into each weight classification.

Form T-9520 which illustrates and describes the new model may be obtained by writing Toledo Scale, Toledo, Ohio.

### Polyethylene Tank Lining

Tank Lining Corp. has developed what it believes will be the first commercially successful method of applying pure polyethylene to steel surfaces as a lining material for tanks, pipe and valves.

The new method involves a special preparation of the steel surface and the spraying on of a previously prepared high molecular weight, high density, low pressure type polyethylene, followed by a carefully controlled heat treating process.

Tank Lining Corp. expects to apply for a patent on the new method, but will license other lining companies which have demonstrated the technical competence to handle specialized lining procedures such as those involved in the use of thermosetting phenolics and phenolic epoxies.

Tests indicate that Tank Lining's application method does not lower or weaken the excellent chemical and physical properties of polyethylene. Laboratory panels lined with polyethylene so far have shown excellent resistance to materials such as 83% phosphoric acid and 90% sulphuric acid. The polyethylene lining is expected to be useful in storage tanks up to 150,000 gallon size, railroad tank cars, tank trucks, chemical processing equipment, duct work, blowers, valves and even barges.

Tank Lining Corp. is interested in cooperating with chemical processing companies in experimental applications or by supplying test panels for their evaluation. For details, write to Tank Lining Corp., 246 Washington Rd., Pittsburgh 16, Pa.

### New Stoker Settler

The new Stoker Model "B" Settler is an exclusive (patent pending) Stoker accessory which makes it possible to settle material in the bag during the entire filling cycle without affecting the weighing mechanism of the packer. The Stoker Settler effectively settles the material being packed without transmitting vibration to the packer scale. Benefits include precision weight accuracy at higher production rates, reduced bag and warehousing costs, and improved package appearance. A simple adjustment controls the intensity and frequency of the Settler to meet the physical characteristics of most packaged materials.

The Stoker Model "B" Settler may be quickly installed on all models

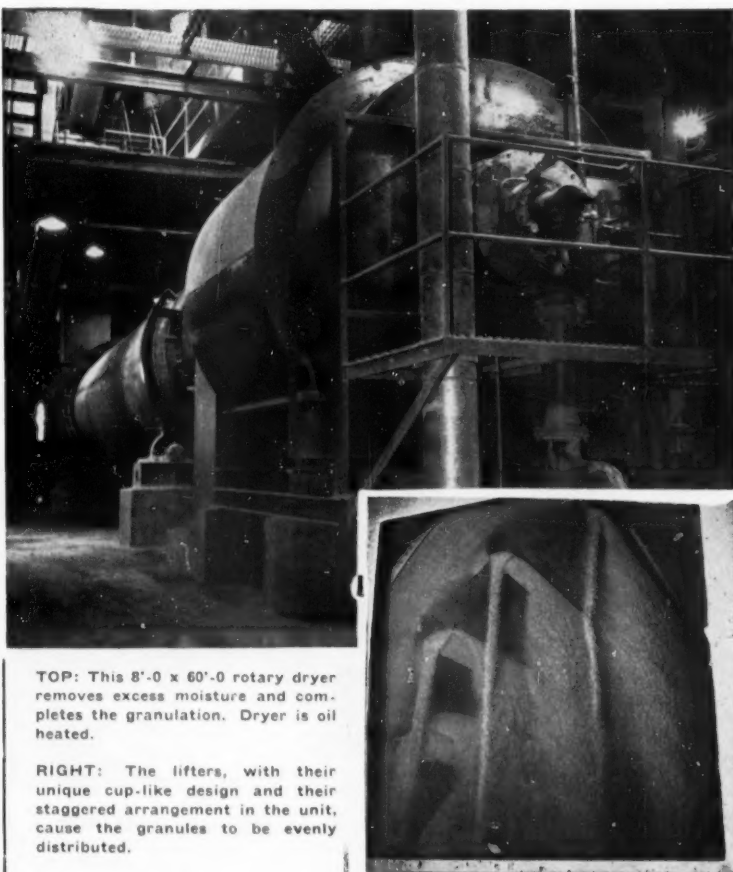
## Equipment News . . .

of Stoker Packers, and, with minor modifications, may be adapted to most other makes of packers now in service. For further information, write to H. L. Stoker Company, 111 S. College Ave., Claremont, Calif.

### Fischer & Porter Booklet

New full-color, 24-page Facilities Booklet describes diversified products of Fischer & Porter Company, manufacturers of flowmeters, process instrumentation, data reduction and automation equipment.

For free copy, write Fischer & Porter Co., 792 Jacksonville Rd., Hatboro, Pa.



TOP: This 8'-0 x 60'-0 rotary dryer removes excess moisture and completes the granulation. Dryer is oil heated.

RIGHT: The lifters, with their unique cup-like design and their staggered arrangement in the unit, cause the granules to be evenly distributed.

**A McDERMOTT 8 x 60 DRYER INSTALLATION AT THE SAGINAW PLANT OF THE AMERICAN AGRICULTURAL CHEMICAL CO.**

*Sound Engineering Economy and Consistently Superior Performance Are Built Into All McDermott*

**DRYERS—COOLERS—AMMONIATORS**

# McDermott Bros. Co.

Allentown,

Pennsylvania



## Equipment News . . .

### Flow Rate Transmitter

The Brooks MPT-50 (patent pending) pneumatic flow rate transmitter is announced as a completely new instrument using unusual design innovations to make the rotameter keep pace with the growing demands of modern control instrumentation. This instrument uses a unique magnetic method to convert, with complete fidelity, the long linear motion of a rotameter metering float—in fact, any linear motion—into a rotary motion for flow rate indication, transmission, or alarm. False or ambiguous response or readings are claimed to be totally eliminated.

A new design approach consists of a magnetic iron strip formed into a helix and encapsulated in a non-magnetic stainless steel tube which floats between two stainless steel, miniature bearing races. The helix assembly is located parallel and adjacent to a stainless steel rotameter extension tube. A metering float extension which has a small magnet embedded in it moves within the tube in direct response to flow rate changes. The leading edge of the helix is constantly attracted to the magnet, thus turning to convert a linear motion into a rotary one. A pointer mounted on top of the helix assembly indicates flow rate.

The transmitter has no contact with the moving parts of the magnetic converter—this in itself is an unusual feature. The unit is unaffected by vibration and a wide range of temperature variations. Supply air pressure variations from 20-to-25 psi have no effect upon output pressure.

For a copy of specification sheet giving full performance details, write Brooks Rotameter Company, Langsdale, Pa.

### New Metering Pump

A newly designed series of continuous-duty metering pumps that transfer liquids and gases through plastic or rubber tubing at exceptionally slow rates and with predetermined accuracy are now being produced by New Brunswick Scientific Company. Adaptable for a wide variety of applications, any one of the Model PA Peristaltic Pumps may be used, by itself, as a metering device to move materials into reaction vessels, or as an auxiliary pumping unit in conjunction with other equipment. The precision control and the ability to operate under sterile conditions, plus the range of flow rate of these compact units—Model PA-1 producing as little as 2 ml. per day; Model PA-93 producing as much as 75 ml. per minute—makes them ideally suitable as research tools for use in the fertilizer field.

Weighing only 8½ pounds, pump can be stood up on end, can lie flat, or can be hung or bolted on wall or panel through lugs provided on cover.

For further details write New Brunswick Scientific Company, P. O. Box 606, New Brunswick, N. J.

### Pocket-Size Conveyor Folder

A new illustrated "pocket-size" folder on their complete line of power belt and gravity conveyors has just been published by The Conveyor Department of A. B. Farquhar Division, The Oliver Corporation.

Included in this handy (3½" x 6¼") full-line folder are basic specification details on the popular line of Oliver-Farquhar package handling and bulk handling power belt conveyors. Nine different types are illustrated and described briefly. In addition, this new folder illustrates and gives specifications for their wheel and roller type gravity conveyors. Illustrations of typical installations complete this fact-full folder.

For your free copy of the new pocket-size folder write: Conveyor Department, A. B. Farquhar Div., The Oliver Corp., 44 N. Duke St., York, Pa.

### Catalog by Bin-Dicator

A consolidated catalog is available for all three Bin-Dicators made by the Bin-Dicator Co. for bulk material level indication and control. The catalog includes photographs, cutaway and schematic drawings, outline dimensions, general specifications, special bin and conveyor applications, actual and suggested systems and applications for the Bin-Dicator, the diaphragm type bin level indicator; Roto-Bin-Dicator, rotating paddle type bin level indicator; Bin-Flo Aerator, to promote flow of dry, finely ground bulk materials. Address requests to The Bin-Dicator Co., 13946 (174) Kercheval Ave., Detroit 15, Mich.



### Free Circular Slide Rule

General Industrial Co. has just introduced a handy circular Slide Rule for engineers and for other plant and office executives. Any executive who must perform simple calculations will find this convenient, pocket-size calculator extremely useful in his work.

Operation of the rule is simple and the results are accurate. To multiply, divide and find proportions is easy and exceptionally fast. Complete easy-to-follow instructions are included with each slide rule.

For your free Circular Slide Rule, write to General Industrial Co., 5738 Elston Ave., Chicago, Ill. To those of our readers who do not qualify as an engineer or other business executive to receive a free slide rule, General Industrial Co. will be pleased to send one for 50¢.

### 360-Degree Warning Beacon

A powerful, 360-degree revolving beacon producing the brightest light ever used for industrial emergency warning purposes has been designed by Federal Sign and Signal Corporation, as a safety alarm and visual communications signal. The new beacon produces 60 brilliant flashes per minute and features a tilting beam, enabling the light to be angled upward or downward extending its effectiveness in industrial locations where workers normally are located above or below the range of conventional horizontal warning lights.

Federal designed the Beacon Ray for use in high noise level areas where audible warning signals are not fully effective.

The new industrial warning signal is modeled after Federal's revolving red flashing light used on fire, police, and other emergency vehicles.

Two models are available, the 271 for surface mounting, and the 271A for stanchion mounting. Full information is available from Folger M. Smith, Signal Division, Federal Sign and Signal Corporation, 8700 South State St., Chicago 19, Ill.

### Rotary Batch Mixer-Blender

A four-page specification sheet on several models of rotary batch mixers, that will mix materials of varying specific gravities and minute or trace quantities, has been made available by Munson Mill Machinery Co.

The mixing principle is fast, accurate blending without reduction of particle size of ingredients that are tumbled, turned, cut and folded, the folder asserts. It is explained how the rotary batch mixer now is available with internal spray pipe for introduction of liquids, providing at the same time faster transfer of heat than with jacketed-type mixer by means of a band of strip heaters around center of drum.

For further information on rotary batch-mixer models, write Munson Mill Machinery Co., Seward Ave., Utica, N. Y.

### Agitator Gear Drive

A new low maintenance gear drive with a solidly silent operation denoting its modern design and precision machining has been introduced by The Pfaudler Co., a division of Pfaudler Permutit Inc. It is intended for use on 300 gallon through 4,000 gallon agitated vessels. While its chief feature is its freedom from the involved and costly maintenance requirements of previous agitator drives, the new unit, designated the B H Drive, offers many additional design advances. These are pilot fit, interchangeable seal or stuffing box, wide bearing span, hardened and lapped spiral bevel gears, five leak proof oil seals, and new "T" head draw bar design.

The B H Drive is currently rated at 12, 30 and 60 H. P. units at 100 R.P.M.

Additional design and application information can be obtained by writing to The Pfaudler Co., 1065 West Ave., Rochester, N. Y. and requesting Bulletin #972.



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For years... First Choice of Leading Fertilizer Manufacturers

Fur-Ag is an inexpensive organic conditioner that is produced in volume and shipped to you on schedule the year around. Fur-Ag reduces bag set, promotes drillability, speeds up curing in the pile and provides bulk. It is sterilized—free from plant diseases, insects, weed seeds—and being dark in color makes a rich-looking piece of goods. Write today for complete information—Bulletin 127.



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AMMONIATED BASE AND SUPERPHOSPHATE

SULPHATE OF AMMONIA

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(42-44% Magnesium Carbonate)

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Speed up shipments  
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The Savage shipping mill costs less because of its design simplicity. Easy to maintain. Full access to all moving parts.

- Fits in a 12-foot square bay.
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- Will accommodate one or two automatic bag fillers.

Write for FREE bulletin to learn how the Savage shipping mill can eliminate the headaches of a shipping season — yet costs you less.

**K. E. Savage Co.**

823-C West 21st St. • Norfolk, Virginia

## Equipment News . . .

### Bulletins on Pelletizer, Mills

A new bulletin describing the recently announced "Super" Pellet Ace is offered by Sprout, Waldron & Co. Four page, two-color Bulletin 201 illustrates the new wide die mill with a standard feeder-conditioner and with a special extra long feeder-conditioner.

Line drawings giving basic dimensions, design data and a table of specifications round out this fact-filled bulletin.

Another new bulletin describing design, construction and application of heavy duty hammer mills has also been announced. Bulletin 1-C illustrates rugged construction of these heavy duty mills and shows five different installation arrangements.

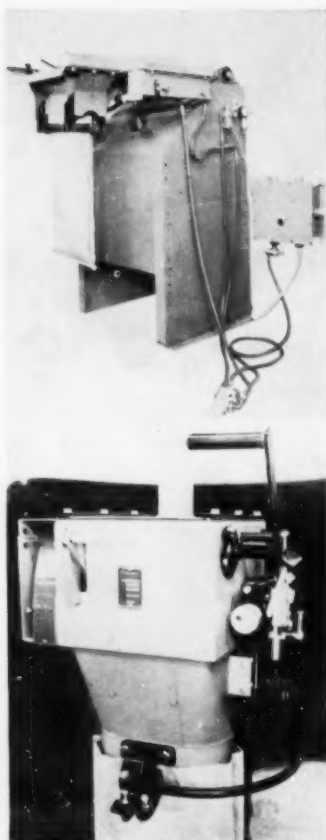
A special schematic drawing explains their pneumatic collecting systems, engineered for the job. The conventional type with blower fan mounted on the mill; the Pneu-Vac system which assures peak grinding capacity; maximum collecting efficiency and minimum maintenance; and the use of a separate fan with direct connected motor are all described and sketched.

Copies of both bulletins available on request from Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

### Sprout-Waldron Bulk Truck

A new ruggedly-built, lightweight "Economy" pneumatic bulk truck designed for high performance at low initial and operating cost has been announced by Sprout, Waldron & Co. Main features of the new design include a 9" screw conveyor with reinforced flights running the full length of the body; full opening drop doors that hinge from the sides of the hoppers body to insure clean flow of materials to the conveyor; simplified drive mechanism and extremely low maintenance.

The standard three-compartment, 12' model has a capacity of 504 cubic feet. Unloading capacities range from 15 to 20 tons per hour. Larger models are scaled dimensionally in the same proportions as the standard line. Details on request from Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.



### New Richardson Devices

Richardson Scale Co. has announced 1) a new bulletin describing and illustrating its E-50 automatic bagging scale; 2) an automatic bag release for air-operated bag holders; and 3) a trigger attachment for semi-automatic gross baggers.

With four photographs and six cut-away line drawings, the new 6-page, 2-color bulletin, 3749B, details the E-50's design, capacities, gravity or power feed operation, and discharge. High-speed accurate net weighing of materials packaged in open-mouth paper or textile bags is also described.

The bulletin also contains engineering drawings, illustrations of

suggested feeding arrangements, and descriptions of accessories.

Standard specifications and optional features are outlined, along with the E-50's ability to handle fertilizer, and a variety of similar materials.

For a copy of Bulletin #3749B, write or call the Richardson Scale Co., Clifton, N. J.

Their automatic bag release (see photo) converts G-73 Impackers, or any bagging scale with a universal air-operated bag holder, to automatic operation and increases bagging speeds accordingly.

Designed for use with textile and paper wall bags, the new bag release lowers labor and production costs. For packing operations, controlled cycle reduces "sifting" through textiles and ends breakage of paper bags.

The unit is air operated. When the operator puts the bag on the spout, he presses a reversible foot pedal which closes the bag holder. This also closes the discharge circuit of the scale. Immediately or on completion of weighing, the scale discharges into the waiting bag, and initiates the timer operation.

At end of adjustable timing cycle, the bag holder opens to release the filled bag, foot pedal resets, timer also resets, and all is ready for the next cycle.

The new unit may be supplied as an optional feature on new equipment or adapted to Impackers and scales already in use.

For more information, write Richardson Scale Co., Clifton, N. J.

Their new trigger arrangement with completely automatic cut-off permits faster bagging with a semi-automatic gross bagger.

For Richardson's G-17 Gross Bagger, the trigger arrangement (see photo) holds the gate open longer, and on most free-flowing materials the trigger can be set for the exact weight desired, eliminating all trimming.

The G-17 gross bagger is designed to fill bags ranging in capacities from 10 to 140 lbs.; other features include: cam-grip bag holder, for fast, simple release of bag; all-mechanical operation, with no delicate parts that might be easily damaged; and slide mounting, which permits serving of multiple spouts.

For further information write Mr. Hart Bandstra, Richardson Scale Co., Van Houten Ave., Clifton, N. J.

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19 20 21 22 23 24 25  
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FEB.

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